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LESSONS FROM FUKUSHIMA ONE YEAR LATER: NRC'S IMPLEMENTATION OF RECOMMENDATIONS FOR ENHANCING NUCLEAR REACTOR SAFETY IN THE 21ST CENTURY

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY

AND THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS
UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

SECOND SESSION

MARCH 15, 2012

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ONE HUNDRED TWELFTH CONGRESS
SECOND SESSION

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C O N T E N T S

LESSONS FROM FUKUSHIMA ONE YEAR LATER: NRC'S IMPLEMENTATION OF RECOMMENDATIONS FOR ENHANCING NUCLEAR REACTOR SAFETY IN THE 21ST CENTURY

THURSDAY, MARCH 15, 2012

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY,
Washington, DC.

The Committees met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Barbara Boxer (Chairman of the full Committee), presiding.

Present: Senators Boxer, Inhofe, Carper, Sanders, Udall, Merkley, Barrasso, and Sessions.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. This hearing will come to order.

A year ago this week in Japan a magnitude 9.0 earthquake struck off the coast of Japan, triggering a tsunami that is reported to have reached up to 45 feet high and stretched up to 6 miles inland. The Fukushima-Dai-ichi Nuclear Plant was hit hard. It lost power, multiple hydrogen gas explosions tore apart reactor buildings, containment structures were damaged, three nuclear reactors melted down, and radiation poured out into the environment. People's lives were uprooted by evacuations to avoid the threat of radiation poisoning.

Many of these men, women, and children have yet to return to their homes. Some may never be able to go back. I know that our thoughts and our prayers go out to the people of Japan and the victims of this catastrophe.

The purpose of this hearing is to conduct oversight on the NRC's efforts to ensure that the 104 nuclear reactors in our Nation are operating safely and that these plants are swiftly implementing the lessons learned from the disaster in Japan.

I would like to take a moment to discuss the safety issue concerning the San Onofre Nuclear Power Plant in California. After I learned of increased deterioration of tubes that carry radioactive water into the plant's steam generators, I wrote to the NRC and Southern California Edison and asked for focus on resolving the safety issues. If these tubes rupture, radiation could be released at levels that exceed safety standards.

Today the NRC announced that it is flying out a special investigation team to conduct a more intensive evaluation of the plant. And I want to say thank you to each and every one of you. I have 9 million people living within 50 miles of that plant. It is critical that the NRC thoroughly review all of the safety implications of this problem, and that the public is assured that the plant can operate safely before it is restarted, and that the NRC keep me up to date on its investigation.

So today is the sixth time after the events in Japan that members of the Committee have gathered to conduct oversight of the NRC. In late March 2011 the NRC created a task force to review our safety requirements in light of the events in Japan. In July 2011 the task force made 12 safety recommendations to help prevent and reduce the impact of such a disaster in the United States of America. The NRC staff prioritized these recommendations and said that several should be implemented without delay.

On Monday the NRC sent three orders requiring these high priority safety improvements at domestic nuclear power plants. So a couple of days ago you took this important action. The first order requires plants to better protect safety equipment needed to address emergencies, to have enough equipment to address an emergency that hits all the reactors at a plant.

The second order requires plants to install enhanced equipment to better monitor the conditions in spent fuel pools. And the third order requires the 31 boiling water reactors in the U.S. that are similar to Fukushima to improve or install venting systems that help to maintain safe conditions within the plants.

The NRC also directed nuclear power plants to re-analyze earthquake and flooding risks, assess their ability to safely operate following such events as well as their capacity to communicate with a prolonged loss of power and to address emergencies at more than one reactor. The NRC has said it will also issue two notices of proposed rulemaking in March and April on steps to take if plants lose electric power and to approve emergency procedures.

I am very encouraged that the NRC has moved forward. It shows the public that the NRC is acting on the information gathered since the Fukushima disaster.

But I want to say something here. I am concerned about the time lines for requiring plants to meet these safety standards. The Commission asked the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within 5 years, by 2016." However, some of the proposed time lines allow plants to avoid meeting needed safety improvements for longer than 5 years. And I will have questions for all the Commissioners on this issue.

You have done good work. Now let's make it happen in the field.

According to FEMA, the Federal Emergency Management Agency, 120 million people live within 50 miles of a nuclear reactor, including more than 9 million people in my home State of California. I also want to take this opportunity to say to you that your actions on San Onofre are very pleasing to me. I have had a history here of having to push hard, and I didn't have to do that in this case. I feel, since I have been critical, that I owe you a thank you.

So that thank you not only comes from me and from Senator Feinstein, believe me, and I am sure the whole congressional dele-

gation, but it comes from the people who are counting on you. They don't know your faces. But they appreciate the fact that you care enough about them to send an investigative team out there today to make sure that you understand what is happening with these tubes and why they are failing. They shouldn't fail. They are too new to fail. And something is happening there, whether it is the chemistry of the water, we don't know.

But I so appreciate this.

And with that, I will turn to Senator Sessions, who came first here on the other side.

OPENING STATEMENT OF HON. JEFF SESSIONS, U.S. SENATOR FROM THE STATE OF ALABAMA

Senator SESSIONS. Thank you, Madam Chairman. Senator Inhofe is at the Armed Services Committee, where he is the senior member.

Good morning. I thank all of you for being here, and appreciate the work that is being done to deal with the aftermath of the Fukushima incident, to review that carefully. It is an important challenge for us. We need to look at that, and from everything I see you have been focused and working hard on it. We need to confront the fact that the Administration claims to be in support of American energy, but their policies continue to drive up the price of energy and reduce the amount of energy produced in the States.

It is certainly true with oil and gas production and also with nuclear power. He says he is committed to restarting the nuclear industry, but the record indicates otherwise.

I was disappointed that the President's appointment as chairman of the NRC was the only member to vote against issuing a license to the Vogtle plant in Georgia. You can't delay these things forever and ever. They drive up the cost, create uncertainty, and basically will kill the new restart of nuclear power in America, which we need for energy, for the economy, and for the environment.

Also, I would note that the chairman has played a central role in the Administration's efforts to close down Yucca Mountain Repository, an endeavor that essentially eliminates 25 years of investments; $14 billion in Government money has gone into that.

On December 15th we heard testimony about the abusive behavior of Chairman Jaczko, his abuse of the law, including the unlawful use of emergency powers, his withholding of information from other members of the Commission, his abusive personal behavior, and intimidation of staff. We heard testimony about the troubling circumstances that led the other four Commissioners, including those appointed by the President, to write a letter to the President, to the White House. It told the President that the chairman's actions are "causing serious damage to the NRC and are creating chilled work environment."

Yet 5 months after that letter was sent the President has not responded in a responsible manner. And regrettably, instead of seeking to get to the bottom of these facts, the President and the Senate Democrats have circled the wagon to protect the chairman from accountability. So I am concerned about it, and I have to say I think it is obvious that there are serious problems in the leader-

ship of the Commission—in the chairman's office—and it needs to be confronted.

And one other thing I would like to say, and I think that President Obama should act soon to ensure that Commissioner Svinicki is not forced from the Commission in June. She was confirmed by the Senate in 2008 with broad support. She brings to the NRC a long and distinguished career as a nuclear engineer and public servant. She has worked at various levels of State and Federal Government. She held an important staff role dealing with nuclear issues for Senator John Warner on the Armed Services Committee. She is a hard worker, competent, and of sound character. Very recently she was willing to sign the letter that blew the whistle on the problems in the Commission.

The NRC needs a full panel of experienced, qualified commissioners. And I am sure and am convinced that Commissioner Svinicki should not be urged to leave. I would urge the President to re-nominate her. She has the support of the Republican seat, and she has the support of the Republican leader. So it would be a travesty, I think, if we reached a situation where Commissioner Svinicki's service on the NRC is allowed to expire and then we would keep the chairman who has created so much controversy. I don't intend to let that happen. I am not going to let that happen, if I have anything to do about it, even if we have to bring the Senate to a grinding halt.

So Madam Chairman, thank you for having this hearing. You have been an open and fair Chairman. I was pleased to know you are still celebrating that big highway bill.

Senator BOXER. How quickly one forgets.

[Laughter.]

Senator SESSIONS. I am pleased to work with you, and you really demonstrated a tremendous amount of energy in bringing people together on that highway bill, and you deserve great credit for it.

Senator BOXER. Well, that is very sweet of you.

I just want to remind everybody that this hearing, what the title is, just to focus ourselves: Lessons from Fukushima One Year Later: NRC's Implementation of Recommendations for Enhancing Nuclear Reactor Safety in the 21st Century.

And with that, I turn to Senator Carper.

OPENING STATEMENT OF HON. THOMAS R. CARPER, U.S. SENATOR FROM THE STATE OF DELAWARE

Senator CARPER. I have a prepared statement, but I am going to go off of it a little bit.

I am just going to say to my friend from Alabama, who, a lot of times we call one another friends, this guy is my friend, I like him a whole lot. I concur with you on your views on Commissioner Svinicki. She is a valued member of the Commission. My hope is that she will be reconfirmed, and I expect to support her.

I also want to say this Commission has been through a tough time over the last year or so, trying to figure out how to work together, for this chairman to figure out how to lead effectively and to play his role well. We had really a public come-to-Jesus meeting here several months ago; you were part of that; I was part of that. My sense is it maybe had a positive effect. We will find out. We

have seen the license now issued for not one but the first two new nuclear power plants that have been built in this country for 20, 30 years. I think that is pretty good progress. Two out of the three appointees of our President actually voted for that. And I think that is a good sign.

So I just, I hope that this hearing focuses more on what can we learn from the awful events of Fukushima, what are we doing about what we have learned, what is the timetable, what do we need to do on this side of the dais to make sure that all those lessons learned are implemented in a timely and effective way.

Thank you.

[The prepared statement of Senator Carper follows:]

STATEMENT OF HON. THOMAS R. CARPER,
U.S. SENATOR FROM THE STATE OF DELAWARE

This past Sunday marked the 1-year anniversary of the massive earthquake and tsunami that struck Japan and triggered the crisis at the Fukushima Dai-ichi nuclear power facility.

The citizens of Japan—especially the friends and families of the thousands of disaster victims—still are struggling to put their lives back together. My thoughts and prayers continue to go out to all of them.

We cannot predict when or where the next major disaster will occur. We do know, however, that robust preparation and response planning are vital to minimize injury and death when it does happen.

That is why over the past year this Committee has exercised its oversight authority repeatedly to ensure that our Nation's nuclear power plants are prepared for the worst.

We want to make sure that our nuclear power plants have the right tools to respond effectively in any crisis to protect the American public.

Even though the NRC concluded that an accident like Fukushima is unlikely to happen in the United States and that we have some of the safest nuclear power plants in the world, I'm still convinced that we can learn from the Fukushima accident.

As President Harry Truman once said, "It's what you learn after you know it all that counts."

Fortunately, we have seen that the NRC—and quite frankly the nuclear industry and other stakeholders—agree with Truman's statement.

We all know we can do better, and the NRC is moving forward to ensure that the U.S. nuclear industry continues to improve its safety and preparedness efforts as life begins to return to normal in many parts of Japan.

Today, I look forward to hearing an update from the NRC Commissioners on their actions to enhance safety at our Nation's nuclear power fleet in light of the lessons we have learned from Fukushima.

Since our last hearing in December the NRC has made several major decisions on how to move forward with these efforts. I am especially interested in hearing today about the seven actions recently issued by the Commission.

Before I conclude my brief remarks this morning, though, I'd like to repeat something that my colleagues have heard me say a number of times before. I doubt that there have ever been five better qualified people to serve as Commissioners than those who serve the American people today. I still believe that.

Since we last heard from the Commissioners in December, I have been encouraged to see that they are still able to get things done despite the differences that were clearly in evidence in this room 3 months ago.

For example, since December the NRC has approved the AP1000 design for new nuclear plants, which uses some of the newest and safest nuclear technology available.

The NRC also reached a true milestone in its history recently by approving Southern Company's licenses to build and operate two new reactors at the Vogtle site in Georgia. They will be the first new nuclear reactors to be built in this country in more than three decades.

In addition the NRC has moved forward on several actions relating to Fukushima in an effort to make sure that our current nuclear power fleet is safe.

Both of those developments suggest—at least to me—that while interpersonal relationships among Commissioners frayed badly last year, the Commission still remains a functioning body.

Moving forward I want to encourage the Chairman and each of the other four Commissioners to continue to work every day to further improve cooperation and collegiality among the Commission members while we attempt to do the same thing here in the Senate.

Most importantly, though, I want us to do everything in our power to ensure that safety is never compromised and that Congress provides the tools and resources the NRC needs to carry out its mission of protecting public safety through responsible, effective nuclear regulation.

Senator BOXER. Thank you so much, Senator.

Senator Barrasso.

OPENING STATEMENT OF HON. JOHN BARRASSO, U.S. SENATOR FROM THE STATE OF WYOMING

Senator BARRASSO. Thank you very much, Madam Chairman.

On the 1-year anniversary of Fukushima the American people do want to know that nuclear safety has improved. The American people want us to ensure that there will not be a repeat of the nuclear disaster in Japan here in the United States, that communities across America are safe from harm.

The Nuclear Regulatory Commission is tasked with protecting us. It is not a responsibility that any of them should take lightly. The incident at Fukushima has led to a process at NRC of developing recommendations to improve nuclear safety here in the United States. I have stated before, this process should be allowed to continue free of partisan politics.

At our last hearing we learned from four commissioners who said that the agency isn't working as effectively as it should under this chairman's leadership, and an inspector general's report on the activities of the chairman is pending. It is my hope that once the report is released, it is thoroughly reviewed and taken seriously by the Committee no matter what the findings.

We also need to have a full slate of commissioners that is stocked with the best, most experienced men and women in the field. As both Senator Sessions and Senator Carper have said, in a bipartisan way, that among those is Commissioner Svinicki. She is very well qualified, and I hope that her renomination is not being stalled by the White House or others for political reasons. That would not serve the public interest in keeping folks safe. We need the most qualified people to serve on this Commission, and I agree in a bipartisan way that Commissioner Svinicki is a very critical member of this Commission. I look forward to working with my colleagues on both sides of the aisle to make sure that that happens.

Second, in a February 9th speech at the Platts Eighth Annual Nuclear Energy Conference in Rockville, Maryland, the chairman spoke of two futures for the nuclear industry. He spoke of one future 20 years from now where there was continuous process of construction of new reactors, as Senator Carper just mentioned. The other future was one where 20 years from now we would see an industry dominated by the process of continuous decommissioning and embarking on a process of long-term trend of continuous decommissioning. The first option to me is the only way forward for America's energy future. It is the only responsible course of action for this Committee to follow if we are serious about providing af-

fordable domestic energy for seniors, for working families, and for small business owners.

The President has called for an all-out, all of the above energy strategy at this year's State of the Union address. The President, if he is serious, then he will join those of us who seek to strengthen this important energy source and staff the Commission with qualified and experienced people.

I thank you, Madam Chairman. I look forward to the testimony.

Senator BOXER. Thank you so much.

Senator Sanders.

OPENING STATEMENT OF HON. BERNARD SANDERS, U.S. SENATOR FROM THE STATE OF VERMONT

Senator SANDERS. Thank you, Madam Chair, and thanks to the members of the Commission for being here.

Clearly we must focus—continue to focus—on the need for safety reforms after the unthinkable disaster in Japan happened, reminding us—and one of the issues that we always have to be aware of with regard to nuclear power, 99.9 percent safe is not good enough. Today, tens of thousands of people remain evacuated from homes—tens of thousands—due to the three Fukushima reactors that suffered meltdowns, an area that has elevated radiation levels in everything from fish to rice to vegetables.

I found it interesting that my friend from Alabama used the word incident. I suggest you were talking about the Fukushima disaster, is that correct? I think that for the people of Japan, probably it was not quite an incident. I think it was a disaster impacting their country. And when we understand that, we have go to understand how serious we must be in making sure the nuclear power in this country is safe.

In a letter to the President following Fukushima I called for a moratorium on license renewals until we could examine what happened and implement reforms. I am especially concerned about that because in the southern part of my State we have a nuclear power plant with a similar design of what took place in Fukushima. And in fact we have 23 reactors in the United States with the same GE Mark I design as Fukushima.

But license extensions continue without accounting for lessons learned. Safety officials expressed concern about this design in the early 1970s, and a top NRC official said in 1986, "Mark I reactors had a 90 percent probability of bursting should the fuel rods overheat and melt in an accident." That was in 1986.

A week after Fukushima, the NRC—timing was extraordinary—relicensed a Mark I reactor in my own State, the Vermont Yankee Nuclear Power Plant, for 20 years without taking time to examine the implications of Fukushima. Relicensed, Vermont Yankee, 1 week after Fukushima. The NRC has granted 71 license renewals and has never rejected one. Seventy-one to zero, in every single instance the NRC has said it is appropriate to relicense a nuclear power plant.

The NRC also voted 3 to 2 in secret to recommend the Government side with Entergy in litigation against Vermont's energy future. In my very strong view the NRC's job is safety—safety. That is what your job is. It is not to tell the people of Vermont or any

other State how they go forward in terms of energy. In my State there is a strong feeling we want to go forward with energy efficiency and sustainable energy. I believe that we have that right. I believe that every other State in the country has that right. If we want to move to sustainable energy and not maintain an aging, trouble-plagued nuclear power plant, I think we should be able to do that.

Finally, I am troubled that a year removed from Fukushima the NRC recently voted 4 to 1 to move forward with the first new nuclear plant license in this country since Three Mile Island without requiring the plant to fully incorporate all post-Fukushima safety reforms recommended by the panel of expert senior NRC staff. The last time we had a hearing with the NRC we heard that the chairman, and we have heard it again today, was responsible for all of the problems associated; he just beats his wife; he is a terrible guy.

Interestingly enough, I would mention to my colleagues there was a 4 to 1 vote on whether or not to go forward with the relicensing of the new plant in Georgia. And there was a division, chairman voted one way, four members voted the other. I would suggest as I did at the last meeting that maybe the difference that is taking place here is not the personality flaws of the chairman but a philosophical difference that exists about how the NRC should proceed.

I look forward to the questioning, Madam Chairman. Thank you.

Senator BOXER. Thank you so much.

Senator Merkley, welcome.

Senator MERKLEY. Thank you, Madam Chair. Is it my turn for questions?

Senator BOXER. Yes, go ahead.

Senator MERKLEY. Great.

I wanted to ask a couple of things, particularly around the venting of gases. Because one of your orders, the third order requires improving or replacement of venting systems——

Senator BOXER. Oh, Senator, this is your time for an opening statement.

Senator MERKLEY. I want to pass on the opening statement so we can get to your testimony.

Senator BOXER. Well, that is fair enough.

OK, we will turn to our esteemed panel now, and we will start off with our Honorable Chairman Jaczko, and he is going to have 5 minutes as chair, and each member will have 3.

Go ahead, Mr. Chairman.

STATEMENT OF HON. GREGORY B. JACZKO, CHAIRMAN, U.S. NUCLEAR REGULATORY COMMISSION

Mr. JACZKO. Chairman Boxer, Chairman Carper, Ranking Member Barrasso, members of the Committee, on behalf of the Commission I appreciate the opportunity to appear before you to provide an update on the NRC's implementation of safety enhancements based on our review of the Fukushima Dai-ichi nuclear accident.

I would stress that the Commission continues to believe that there is no imminent risk from continued operation of nuclear power plants in the United States. At the same time, however, our assessment of the events at Fukushima Dai-ichi leads us to con-

clude that additional requirements should be imposed on licensees to increase the capability of nuclear plants to mitigate and protect against beyond design basis extreme natural phenomena.

When we last appeared before you in December the Commission was considering the staff's report on prioritizing the recommendations of the near-term task force into three separate tiers. Tier 1 consists of actions to be taken without delay and for which sufficient resource flexibility, including the availability of critical skill sets, exists. Tier 2 actions can be initiated as soon as sufficient resources or critical skill sets become available. And finally, Tier 3 recommendations require further staff study or shorter-term actions be undertaken first.

I would stress that these are not necessarily in a priority order. While Tier 3 items may require additional staff study, they are not necessarily actions that are of less importance to safety.

As a result of public meetings with stakeholders, including the industry and the public, and with the Advisory Committee on Reactor Safeguards, there have been a number of enhancements to the Tier 1, Tier 2, and Tier 3 recommendations. As has been mentioned, on March 12th the Commission issued three immediately effective orders to U.S. commercial nuclear reactors. The orders reflect a tremendous effort on the part of the NRC staff and the Commission to produce a comprehensive package in an expedited manner.

The first order requires the plants to better protect safety equipment installed after the September 11th, 2001, terrorist attacks and to obtain sufficient equipment to support all reactors at a given site simultaneously. The second order requires the plants to install enhanced equipment for monitoring water levels at each plant's spent fuel pool.

And the third order applies only to U.S. boiling water reactors that have Mark I or Mark II containment structures. These reactors must improve venting systems or for the case of the Mark II plants, which is a smaller number, install new systems that help prevent or mitigate core damage in the event of a serious accident.

For all three of these orders licensees are required to submit their plans for implementing the requirements to the NRC by February 28th, 2013, and complete full implementation no later than two refueling cycles after submittal, or December 31st, 2016, whichever comes first.

Additionally, licensees are required to provide periodic status reports so that staff can monitor their progress.

Now, in addition to these three orders licensees were also issued a request for information. Licensees were asked to reevaluate the seismic and flooding hazards at their sites using current NRC requirements and guidance and identify actions that are planned to address vulnerabilities. Licensees were requested to develop a methodology and acceptance criteria and perform seismic and flooding walk-downs.

Finally, licensees were required to assess the ability of their current communications to perform under conditions of onsite and offsite damage and prolonged loss of electrical power. As part of this initiative they were also requested to assess their staffing levels

needed to respond to a large scale natural event and to implement strategies contained in the emergency plan.

There are remaining Tier 1 recommendations which address station blackout in the integration of emergency procedures. These continue to be worked by the staff. The station blackout rulemaking is a high priority activity with a goal of completion within 24 to 30 months from October 2011. And the staff has recently provided—or is finalizing an advanced notice of proposed rulemaking for that particular rulemaking.

Now, we anticipate beginning work on Tier 2 recommendations when we have the necessary information from the Tier 1 activities and when we can free up critical resources from these efforts. The issuance of the orders and letters on March 12th is a significant step forward on our post-Fukushima efforts. We are making strong progress, and as always I continue to be impressed by the staff's dedication and expertise.

There is still, however, a great deal of work ahead of us, for both the Commission and the staff. This past year was very challenging for the NRC, but it was also a very productive year for us. As we look forward the agency expects to meet new and unanticipated challenges. We are confident that the NRC will continue to ensure the safe and secure operation of the existing licensed facilities while also ensuring the safe and secure construction and operation of new nuclear plants, possibly including small modular reactors.

So with that, I appreciate the opportunity to appear before you and would be happy to answer any questions you may have.

Thank you.

[The prepared statement of Mr. Jaczko follows:]

WRITTEN STATEMENT

BY GREGORY B. JACZKO, CHAIRMAN

UNITED STATES NUCLEAR REGULATORY COMMISSION

TO THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

AND THE

SUBCOMMITTEE ON CLEAN AIR AND NUCLEAR SAFETY

UNITED STATES SENATE

March 15, 2012

Introduction

Chairman Boxer, Ranking Member Inhofe, Chairman Carper, Ranking Member Barrasso, and Members of the Committee, on behalf of the Commission, I appreciate the opportunity to appear before you to provide an update on the NRC's implementation of safety enhancements based on our review of the Fukushima Dai-ichi nuclear accident. I am pleased to report on the significant progress that we have made toward strengthening the safety of nuclear power plants in the United States.

With everything that we have assessed to date, the Commission continues to believe that there is no imminent risk from continued operation of nuclear power plants in the United States. At the same time, the NRC's assessment of insights from the events at Fukushima Dai-ichi leads us to conclude that additional requirements should be imposed on licensees to increase the capability of nuclear power plants to mitigate beyond-design-basis extreme natural phenomena.

When we last appeared before you in December, the Commission was considering the staff's report on prioritizing the recommendations of the Near-Term Task Force ("Task Force"). That report prioritized the Task Force recommendations into three categories, or tiers. Tier 1

consists of actions to be taken without delay, and for which sufficient resource flexibility, including the availability of critical skill sets, exists. Tier 2 comprises the next set of actions that can be initiated as soon as sufficient resources or critical skill sets become available. Tier 3 recommendations require further staff study or shorter-term actions to be undertaken first.

The staff's paper also included two other important components: schedules, milestones, and resources associated with Tier 1 and Tier 2 activities; and the identification of a number of additional issues with a clear nexus to the Fukushima Dai-ichi event that may warrant regulatory action, but which were not included with the Near-Term Task Force recommendations. Those additional issues have been prioritized by the staff and, where appropriate, folded into the existing three tiers of recommendations.

The staff has been conducting frequent public meetings with stakeholders, including the industry and the public, and with the Advisory Committee on Reactor Safeguards (ACRS). In conjunction with those meetings, the staff developed a process for reviewing any new recommendations from stakeholders and the ACRS to ensure a disciplined approach was applied for identifying lessons learned from Fukushima.

As a result of this input, there have been enhancements to Tiers 1, 2 and 3 recommendations that revise or expand the scope of those recommendations.

In February, the staff provided the Commission with draft Tier 1 orders. The orders require several things:

1) Licensees must develop, implement, and maintain guidance and strategies to maintain or restore core cooling, containment, and spent fuel pool cooling capabilities following a beyond-design-basis extreme natural event.
2) Licensees with BWR Mark I and Mark II containments must have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following beyond-design-basis events that result

in the loss of active containment heat removal capability or prolonged station blackout.

3) All operating reactors must have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of certain specified pool water level conditions by trained personnel.

For all three of these orders, licensees are required to submit their plans for implementing these requirements to the NRC by February 28, 2013, and complete full implementation no later than two refueling cycles after submittal of a licensee's plan or December 31, 2016, whichever comes first. Additionally, licensees are required to provide periodic status reports so that the staff can monitor their progress in implementing the orders and take prompt and appropriate regulatory action, if necessary.

The Commission issued these orders on Monday, March 12, 2012.

In addition to the three orders, on March 12, licensees were also issued a "request for information" that includes the following:

1) Licensees were asked to perform and provide the results of a reevaluation of the seismic and flooding hazards at their sites using present-day NRC requirements and guidance, and identify actions that are planned to address vulnerabilities. The results will determine whether additional regulatory actions are necessary (e.g., ordering plant modifications).

2) Licensees were requested to develop a methodology and acceptance criteria and perform seismic and flooding walkdowns. We expect any performance deficiencies identified would be addressed by the site's corrective action program. Licensees were asked to confirm that they will be using the walkdown procedures jointly developed by the NRC and industry or provide alternative, plant-specific procedures.

3) Licensees were requested to assess the ability of their current communications to perform under conditions of onsite and offsite damage and prolonged loss of alternating current (AC) electrical power. Licensees also were requested to assess the plant staffing levels needed to respond to a large-scale natural event and to implement strategies contained in the emergency plan.

The remaining Tier 1 recommendations comprise two rulemakings addressing station blackout and integration of emergency procedures. The Commission directed the use of an Advance Notice of Proposed Rulemaking for the station blackout rulemaking to allow for early stakeholder involvement and formal comments. The Commission also designated the station blackout rulemaking as a high-priority activity with a goal of completion within 24-30 months from October 2011. The emergency procedures integration rulemaking also will use an Advance Notice of Proposed Rulemaking to solicit early stakeholder input.

Going forward, we will continue stakeholder interaction to support any necessary guidance development activity. Beyond that, we will continue our ongoing efforts on the highest priority, near-term rulemakings.

Regarding Tier 2 recommendations, we anticipate beginning that work once we collect information from Tier 1 activities that is required in order to address Tier 2 recommendations, and we are able to free up critical resources previously devoted to Tier 1 activities. For example, the review of other external hazards will begin when resources currently being applied to the flood hazards assessments become available.

Chairman Boxer, Ranking Member Inhofe, Chairman Carper, Ranking Member Barrasso, and Members of the Committee, this concludes my formal testimony today. On behalf of the Commission, thank you for the opportunity to appear before you and for your continued interest in our work on these important issues. We look forward to continuing to work with you to advance the NRC's important safety mission. We would be pleased to respond to any questions you may have.

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

August 10, 2012

The Honorable Barbara Boxer
Chairman, Committee on Environment and
Public Works
United States Senate
Washington, DC 20510

Dear Madam Chairman:

The U.S. Nuclear Regulatory Commission appeared before the Committee on Environment and Public Works on March 15, 2012, at a hearing entitled, ***"Lessons from Fukushima One Year Later: NRC's Implementation of Recommendations for Enhancing Nuclear Reactor Safety in the 21st Century."*** From that hearing, you forwarded questions for the hearing record. Responses are enclosed.

Please note that, given the subsequent resignation and departure of former Chairman Jaczko, no responses are offered to questions asking him to address specific actions. Additionally, because of the unusual delay in submitting these responses, an effort was made to provide answers that are contemporary to the timeframe of the hearing. We hope this is helpful as you work to complete the hearing record. However, in an effort to further update the Committee, updates related to matters of general interest are enclosed with this letter for your reference.

If I can be of further assistance, please do not hesitate to contact me.

Sincerely,

Rebecca L. Schmidt, Director
Office of Congressional Affairs

Enclosures:
As stated

cc: The Honorable James M. Inhofe, Ranking Member
Committee on Environment and Public Works

Questions for Chairman Jaczko

Questions from:

Senator Boxer

QUESTION 1. **In February, I wrote to you about safety issues at the San Onofre Nuclear Generating Station in California, including the rapid deterioration of tubes that carry radioactive water. I asked the NRC to comprehensively review safety concerns at the plant, and to promptly address all safety issues. On March 15, the NRC announced that it was sending an Augmented Inspection Team to the plant to review the circumstances that lead to the tube failures. Describe any findings of the NRC team's investigation and the steps that have been taken to ensure that the safety problems at the plant are addressed.**

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

The NRC Augmented Inspection Team is continuing its inspection activities of the steam generator tube issues at the San Onofre Nuclear Generating Station, Units 2 and 3, and has not drawn any conclusions at this time. The objectives of the NRC Augmented Inspection Team included: 1) determine probable causes; 2) assess impacts of differences in design, manufacturing, and operation on tube wear; 3) review and assess quality assurance/quality control during manufacturing; 4) review implementation of NRC and industry steam generator lesson learned; and 5) review steam generator engineering models for thermal/hydraulic and vibration analysis. The team continues to review the licensee investigation and new information as it becomes available.

The NRC Confirmatory Action Letter, dated March 27, 2012, will remain in effect until the NRC has approved Southern California Edison's compliance with the requirements in the letter, including the determination of causes of the tube-to-tube interactions that resulted in steam generator tube wear, and the implementation of actions to prevent loss of integrity due to these causes. Southern California Edison cannot restart Unit 2 or Unit 3 until the NRC has concluded that San Onofre Nuclear Generating Station Units 2 or 3 can be operated without undue risk to public health and safety, and the environment.

QUESTION 2. **On March 27, 2012, the NRC issued a Confirmatory Action Letter to Southern California Edison (SCE) documenting the actions the San Onofre plant must take before restarting the reactors. That letter also requires SCE to notify the NRC in writing when it has completed the actions. Provide me with a status update if SCE informs the NRC that SCE intends to move forward with restarting the plant and a copy of SCE's letter when it is received by the NRC.**

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

To date, SCE has not provided written notice to the NRC of completed actions necessary for restart. The NRC will notify you of the results of our review of SCE actions taken in response to the Confirmatory Action Letter and provide you a copy of these letters, which will also be publicly available.

QUESTION 3. **Recent reports of have raised concerns that the redesign of the San Onofre steam generators may have contributed to the rapid deterioration of the tubes. a) What is the status of the NRC's assessment of the cause of the tubes' deterioration? b) Was the NRC fully informed of the redesign of the steam generators? c) Did the NRC assess the safety implications of the design changes and approve of them?**

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

The NRC's inspection of the causes of the steam generator tube deterioration is continuing. As a result, the NRC has not yet reached final conclusions regarding the causes of the deterioration.

SCE did inform the NRC of the steam generator design change. Additionally, on June 25, 2009, in response to an SCE request, the NRC issued license amendments that changed certain technical specifications related to SCE's proposed replacement of their steam generators. The licensee conducted the steam generator replacement under the NRC regulation 10 CFR 50.59, which does not require prior NRC review and approval before making the change. As part of the inspection activities for replacement of the steam generators in 2009 and 2010, and in accordance with the NRC inspection program, portions of the licensee's steam generator engineering design change evaluation were reviewed by NRC inspectors. The safety implications of the design change were reviewed by NRC inspectors through the inspection program. Inspectors also observed the installation and testing of the new steam generators.

The results of those inspection activities for Units 2 and 3 are documented in publicly available NRC Inspection Reports and no issues were identified.

In response to the premature wear issues at the facility, the NRC saw the need to re-evaluate the process governing the design change and replacement of the steam generators. A primary objective of the Augmented Inspection Team is to review the steam generator design changes to ensure they were properly reviewed and approved.

QUESTION 4. The NRC has recently focused its attention on the high-priority safety recommendations that the NRC's staff said should be taken without delay. What is the NRC's timeline for fully implementing the remaining safety recommendations? Provide me with a written document that describes the actions that the NRC plans to take, and the dates that those actions will be started and completed, in order to implement all of the Task Force's safety recommendations.

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

On December 15, 2011, the Commission approved the staff's recommended three-tiered prioritization of the Near-Term Task Force recommendations. The Tier 1 recommendations are those actions that should be implemented without delay. The Tier 2 recommendations are those actions that need further technical assessment or critical skill sets to implement. The Tier 3 recommendations are longer-term actions that depend on the completion of a shorter-term action or need additional study to support a decision on whether regulatory action is warranted.

On March 9, 2012, the Commission approved the staff's recommended actions for addressing the Tier 1 items and staff has taken action to implement all of these items. As a result, the agency issued three orders on March 12, 2012, that contained several requirements. One order requires each boiling water reactor (BWR) with a Mark I or Mark II containment to have a reliable hardened vent. Another order, issued to all reactor licensees (including holders of construction permits and holders of combined licenses), requires a three-phase approach to the development of strategies to maintain or restore core cooling, containment and spent fuel pool (SFP) cooling capabilities following a natural event beyond what plants were designed to endure. A third order, also issued to all reactor licensees, requires installation of enhanced SFP

instrumentation. The agency anticipates issuing implementation guidance for the orders by August 31, 2012. Each licensee will be required to achieve full compliance within two refueling cycles after the issuance of the guidance, or by December 31, 2016, whichever comes first.

Request for Information letters were also issued on March 12, 2012, directing each nuclear power plant licensee to reevaluate the seismic and flooding hazards at their site using present-day methods and information, conduct walkdowns of their facilities to ensure protection against the seismic and flooding hazards in their current design basis, and reevaluate their emergency communications systems and staffing levels. The NRC anticipates that most nuclear power plant licensees will complete the walkdowns and emergency communications and staffing assessments within the next year, except for the portions of the emergency staffing assessment that are tied to implementation of the order to develop mitigating strategies (i.e., the strategy must be developed before the staff needed to implement it can be assessed). The majority of nuclear power plant licensees, including those plants with the greatest potential seismic and flooding risks, are expected to complete the seismic and flooding reevaluations within the 5-year goal established by the Commission. The NRC will assess the licensees' responses and impose any additional safety requirements, as warranted.

The two remaining Tier 1 recommendations consist of rulemakings addressing station blackout (SBO) and the integration of emergency procedures at nuclear power plants. On March 20, 2012, the NRC issued an advanced notice of proposed rulemaking (ANPR) to solicit public input on the SBO rulemaking. This step moves the NRC closer to issuing a final rule within the 24-to-30-month schedule directed by the Commission. The NRC has requested public comments on the ANPR by May 4, 2012. Another ANPR on the integration of emergency procedures at nuclear power plants was issued April 18, 2012, with public comments requested by June 18, 2012.

We anticipate beginning work on the Tier 2 recommendations after collecting information from the Tier 1 activities, and as soon as resources currently devoted to those activities become available. In July 2012, the NRC staff plans to provide the Commission with a plan for undertaking the remaining, longer-term Tier 3 activities.

QUESTION 5. At the hearing, you expressed concern that the timelines for NRC's efforts to re-examine the seismic hazards at nuclear power plants were slipping beyond 5 years. You explained the earliest completion date would be in 2017 and the latest completion date for lower risk plants would be in 2019. Describe what plants have until 2017 or 2019 under those timelines. What can be done to accelerate the completion of the seismic hazards? How does the Commission reconcile those completion dates with the direction it provided to the staff to strive to complete all recommendations by 2016?

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

The NRC staff has acknowledged that there are identified factors associated with completion of the seismic analysis that may challenge the completion schedule desired by the Commission. For example, limited national expertise exists (for industry, licensees, and other stakeholders) to perform the detailed probabilistic safety analyses of seismic hazards. This may require that the re-evaluations be sequenced. Therefore, the NRC will review seismic hazard evaluations provided by its licensees and prioritize U.S. plants such that completed risk evaluations begin to be submitted in 2017.

The Commission will continue to monitor the industry's efforts to ensure that the seismic re-evaluations are completed as expeditiously as possible. The NRC staff will evaluate each licensee's response to the request for information and take additional regulatory action, as necessary.

QUESTION 6. **The NRC's staff has stated that the high-priority safety recommendations should be implemented without delay and should strive to complete these recommendations by the end of 2016. In some cases, the NRC has set timelines for implementing actions that are "no later than" specific dates. Do you agree that plants should use the fastest possible timeline to effectively implement these high-priority recommendations rather than waiting until the deadlines? Will the NRC act quickly to establish a platform that ensures that Congress and the public are kept fully informed, in real time and in a publically accessible format, of each plant's progress toward completing each recommendation?**

ANSWER

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

On October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." The Commission and the NRC staff must also, however, continue to balance the use of available resources to address lessons learned from the Fukushima event with day-to-day activities necessary to ensure continued safe operation of U.S. nuclear power plants and the completion of other important safety enhancements not related to lessons learned from Fukushima.

The NRC agrees that licensees should implement all of the Tier 1, high-priority actions without unnecessary delay. However, many of the plant modifications necessary to implement the requirements of the issued orders must be made when the reactor is shutdown. This allows

operators, engineers and maintenance crews to access areas normally off-limits during plant operation so that they may collect design information, assess options for implementing enhancements, and, ultimately, install the necessary modifications. Accordingly, the schedules established in the issued orders require licensees to "complete full implementation no later than two refueling cycles, or by December 31, 2016, whichever comes first." The NRC staff expects that licensees will use the first refueling outage to collect the necessary information to design and engineer the safety enhancements and modifications that will be installed during the second outage. This schedule will lead to many plants achieving full compliance with the orders as early as 2014, and all plants by 2016.

Our staff is closely monitoring licensees' efforts to ensure that the Tier 1 actions are assessed properly and are completed as expeditiously, and as safely, as possible. To facilitate this monitoring, the NRC required, via orders, each nuclear power plant to submit periodic status reports of its progress toward implementing the new requirements.

As the NRC proceeds with obtaining full compliance with the issued orders, our staff will ensure that all actions are transparent and open to the public. The staff plans to conduct several additional public meetings this summer associated with implementation of the Tier 1 actions so that stakeholders will have the opportunity to better understand what is required of licensees. The staff will also solicit stakeholder feedback (e.g., meeting feedback forms, the NRC's website, or the established public e-mail account) for all of the staff's proposed regulatory actions.

QUESTION 7: **In February, you cast the lone "no" vote in a decision to approve the first new U. S. nuclear power plant in over three decades, at Vogtle in Georgia. You wrote, "I cannot support issuing these licenses without a binding commitment that the Fukushima enhancements... would be made before operation... I simply cannot ignore what happened at Fukushima." In March, you cast the lone "no" vote on licensing the new reactors at Summer in South Carolina. Why did you think it was important to require that commitment in the licenses rather than through measures such as orders?**

ANSWER:

Former Chairman Jaczko has left the Commission.

QUESTION 8: **Does the NRC have the legal authority to consider all the harmful impacts to public health and safety, defense and security, and the environment that may occur as a result of a nuclear reactor emergency?**

ANSWER:

The NRC has broad authority under the Atomic Energy Act of 1954, as amended (AEA), to protect public health and safety and common defense and security. The NRC also has authority under the AEA to minimize danger to life and property. The AEA empowers the NRC to consider, in establishing its regulatory requirements, the direct impacts of radiological hazards, including radiological impacts from a nuclear reactor emergency. Section 161b of the AEA authorizes the Commission to "establish by rule, regulation, or order, such standards and instructions to govern the possession and use of special nuclear material, source material, and byproduct material as the Commission may deem necessary or desirable to promote the common defense and security or to protect health or to minimize danger to life or property . . . ." In addition, § 103b(2) of the AEA, which governs the licensing of power reactors, provides that the Commission shall issue a license to persons "who are equipped to observe and who agree to observe such safety standards to protect health and to minimize danger to life or property as the Commission may by rule establish." Finally, although the National Environmental Policy Act (NEPA) does not provide the NRC with substantive authority, the NRC can, in fulfilling its obligations under NEPA, consider the environmental, socio-economic, and other non-radiological impacts of a proposed action and reasonable alternatives to that action.

QUESTION 9. **The Commission provided direction to the NRC staff to strive to complete all recommendations by 2016. However, the NRC's recent orders provide plant operators with more than five years to complete important seismic re-evaluations. What steps can the Commission take to ensure that the NRC completes these recommendations by 2016?**

ANSWER:

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

The Commission's highest priority is regulatory activities associated with ensuring the safety and security of currently operating reactors. Consistent with the thorough and disciplined review that has been conducted to date on Fukushima lessons learned, the Commission has directed the NRC staff to ensure that agency resources are appropriately applied and that activities are prioritized according to their importance to public health and safety.

On October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." As the NRC works to achieve this goal, the Commission and staff continue to be focused as well on the agency's broader responsibilities toward ensuring the continued safe operation of U.S. nuclear power plants. Therefore, the NRC must integrate competing priorities of the implementation of the Fukushima lessons learned and its existing work, so that additional important safety issues are not unduly impacted or delayed.

Since the issuance of the Commission's direction, the NRC's plans to implement the lessons learned have been considerably enhanced by stakeholder interactions. These enhancements

have led to expansions of the original recommendations to include additional capabilities to prevent, mitigate, and respond to an extreme natural event at a U.S. nuclear power plant.

Progress has been made toward the five-year goal. On March 12, 2012, the NRC issued the first regulatory requirements for the nation's 104 operating reactors based on lessons learned at Fukushima Dai-ichi. The NRC issued three orders requiring safety enhancements of operating reactors, construction permit holders, and combined license holders. These orders require nuclear power plants to implement safety enhancements related to: 1) mitigation strategies to respond to extreme natural events resulting in the loss of power at plants; 2) ensuring reliable hardened containment vents; and 3) enhancing spent fuel pool instrumentation. The plants are required to promptly begin implementation of the safety enhancements and complete implementation within two refueling outages or by December 31, 2016, whichever comes first. In addition, the NRC issued a "request for information," requiring that licensees for each reactor reevaluate the seismic and flooding hazards at their site using present-day methods and information, conduct walkdowns of their facilities to ensure protection against the seismic and flooding hazards in their current design basis, and reevaluate their emergency communications systems and staffing levels. Implementation of each of the issued orders and requests for information will require substantial engineering work for each plant.

Completion of the detailed seismic and flooding reevaluations may be resource intensive and time consuming for some licensees due, in part, to the features of their local geography. An additional challenge is that the reevaluations may need to be sequenced because limited national expertise exists (for the NRC, licensees, and other external stakeholders) to perform the detailed safety analyses of seismic and flooding hazards. In the seismic area, these factors may challenge the schedules sought by the Commission. Recognizing these obstacles, the NRC will review seismic hazard evaluations provided by its licensees and prioritize U.S. plants

such that completed risk evaluations begin to be submitted in 2017. The Commission will continue to monitor the industry's efforts to ensure that the seismic and flooding reevaluations are completed as expeditiously as possible.

Senator Carper

QUESTION 1: You recently decided to grant new reactor licenses for the first time in 30 years to the Vogtle site in Georgia where two new reactors will be built. However, not all of you agreed on what the appropriate approach to addressing the Fukushima recommendations should be. Can each of you share your perspectives on that decision?

ANSWER:

Former Chairman Jaczko has left the Commission.

Senator Gillibrand:

QUESTION 1. **I understand determinations regarding emergency planning zones have been designated as a Tier III issue for long-term analysis. Can you explain why that approach was taken and what issues you seek to address over the long-term? Additionally, how long does the NRC anticipate it will take to develop new guidance on this issue? This is particularly important in New York where many of the reactors, such as Indian Point, Ginna, and the reactors at Oswego near major population centers where, without adequate planning, evacuation could be exceedingly difficult.**

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

For planning purposes, the NRC defines two forms of Emergency Planning Zone (EPZ). The Commission has defined: 1) a plume exposure pathway EPZ as an area of approximately 10 miles in radius, and 2) an ingestion pathway EPZ as an area of approximately 50 miles in radius around each nuclear power plant. EPZ size and configuration may vary from plant to plant due to local emergency response needs and capabilities, demography, topography, land characteristics, access routes, and jurisdictional boundaries.

Over the years, the NRC has conducted several studies that have provided additional insights regarding the adequacy of this approach. The studies support our basis for concluding that the existing emergency preparedness framework and regulations provide reasonable assurance of

adequate protection of public health and safety in the event of a radiological emergency at a U.S. nuclear power plant.

Since the events of March 2011 at Fukushima Dai-ichi, the NRC staff has been focused on assessing the identified lessons-learned and making the necessary enhancements to its regulatory system in a systematic and methodical manner. In contrast with the event in Japan, during which information being received by the NRC was often conflicting, incomplete, and potentially unreliable, the U.S. has a dedicated data and communications network to facilitate emergency information sharing in the event of an emergency at a domestic nuclear power plant. Each licensee and affected State has a dedicated link to NRC's Emergency Response Data System (ERDS), which supplies a steady stream of important plant parameters. The NRC independently monitors plant conditions and protective recommendations made by the licensee and State. In light of these considerations, the NRC staff recommended that the EPZ size be reviewed as a longer-term activity to determine whether any enhancements to existing strategies are warranted. In December 2011, the Commission approved the staff's prioritization of the Near-Term Task Force recommendations without significant schedule modification. The NRC staff will provide additional information to the Commission on its proposed plan to review EPZ size in a July 2012 Commission Paper, which will address all of the longer term action items.

QUESTION 2. Another area that caused major issues in Japan was ensuring accurate information sharing, both between the private sector and the government and with the public at large. What steps has the NRC considered to ensure that key federal and local responders – including not only the operator and the NRC, but also FEMA and local emergency management – are fully informed and are receiving timely and accurate information, and that that information is getting to the public in an appropriate way?

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

In March 2011, shortly following the earthquake and tsunami, the NRC's Emergency Operations Center went into an around-the-clock monitoring mode, with our first concern being the potential for a tsunami to affect U.S. plants and radioactive materials on the west coast, Hawaii, Alaska, and in the U.S. territories in the Pacific. When the potential threat of a tsunami on NRC-licensed facilities had passed, NRC's focus turned towards providing advice to the U.S. Embassy related to the safety of U.S. citizens in Japan and assistance to the Japanese.

One of the most challenging aspects in the early phase of NRC's response was that, unlike our expectation for an event at a U.S. nuclear facility, the NRC had relatively little access to information on the plant design or its post-event status. The Agency did not have a pre-existing plan to address an overseas accident that did not affect any domestic licensed facilities, but the NRC response program was flexible enough to provide highly effective support to the U.S. Government's overall response efforts. Nevertheless, we expect that defining lead and supporting agencies for an international response effort would likely result in more effective communications and coordination. NRC is actively participating in interagency efforts to address these issues.

Should an event happen within the U.S., the NRC will have ready access to reliable information about the affected nuclear power plant. There are many different methods by which NRC would obtain plant information. The Emergency Response Data System is a direct connection from the plant to the NRC operations center and provides up-to-the-minute plant parameters; the NRC resident inspectors are on site and function to report back plant status to the NRC; and there are dedicated telephone links by which NRC can communicate with plant personnel. Nuclear power plant operators would establish these telephone links and promptly notify the NRC, as well as State and local authorities, of the ongoing events. Operators are required to maintain these communication links throughout an incident.

Under the authority of the National Response Framework, the Department of Homeland Security coordinates communications links at the national, state, and private sector level. The NRC participates in the National Incident Communications Conference Line – a communications network that facilitates the coordination of information and communication among federal agencies. The State Incident Communications Conference Line (SICCL) facilitates information exchange with State officials. Since the events at Fukushima, the NRC State Liaison Officers have become participants in the SICCL communication network. Information and resource sharing among private companies and organizations, such as the Nuclear Energy Institute, is coordinated through the Private Sector Incident Communications Conference Line.

In accordance with NRC and FEMA regulations, the licensee and the affected State and local jurisdictions coordinate their efforts to inform the public of what protective actions to implement through a series of notification systems such as the Emergency Alert System. The NRC reaches out to the public as part of its crisis communication plan using established outreach tools, such as press releases, web postings, and other written material such as Frequently Asked Question sheets and backgrounders. The NRC also communicates via social media

tools, including the NRC blog, Twitter, YouTube, and Flickr. The NRC also has an emergency event web page that is ready to be used should there be an event resulting in a radiation release in a community.

QUESTION 3. **I know the Commission has looked at planning and strategies for addressing beyond design basis external events. In developing these strategies, has the Commission considered the potential and uncertain impacts of climate change and corresponding increases in severe weather events in determining the range of events that should be planned for?**

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

Protection from natural phenomena is critical for continued safe operation of nuclear power plants. Given that new information has been developed on natural phenomena hazards since currently operating plants were licensed, the NRC has found it necessary to confirm the adequacy of the hazard assumptions for U.S. plants, and their ability to protect against extreme natural events.

In accordance with the March 12, 2012, request-for-information letter issued by the NRC, reactor licensees have been requested to re-evaluate the seismic and flooding hazards at their site using present-day methods and information and to conduct walkdowns of their facilities to ensure protection against hazards including earthquakes, local intense precipitation, floods of streams and rivers, storm surges, seiches, tsunamis, and dam failures. Completion of the detailed seismic and flooding reevaluations may be resource-intensive, time-consuming, and complex for some licensees due, in part, to the geographical features of their location. Licensees will need to perform safety analyses of their seismic and flooding hazards, requiring a detailed analysis of many of the considerations that you listed above (i.e., climate, range of events, likelihood of event occurrence, etc.). The NRC staff will continue to engage with

stakeholders in order to better understand the implementation plans and actions associated with these high-priority seismic and flooding re-evaluations.

The NRC intends to address other external hazards, such as wind and impacts from tornadoes and hurricanes, and snow and ice loads from winter weather, as a Tier 2 activity that will be initiated as soon as sufficient resources become available.

QUESTION 4. **I understand that most of the current orders being moved forward this week are intended to be implemented within two refueling cycles or by the end of 2016. Many of these recommendations respond to important vulnerabilities identified by Fukushima, and I want to ensure that these measures are being implemented in a timely fashion as possible. In particular, some of the recommendations – for example requirements to have remote monitoring of spent fuel pools, so a radiation leak does not prevent operator from ensure the fuel is still safe – constitute urgent measures that could be very important in the event of an incident. What is the Commission doing to implement some of these measures on a quicker timescale to ensure safety, and to accelerate our ability to address the longer-term issues identified in Tier 2 and 3?**

ANSWER:

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

The Commission's highest priority is regulatory activities associated with ensuring the safety and security of currently operating reactors. Consistent with the thorough and disciplined review that has been conducted to date on Fukushima lessons learned, the Commission has directed the NRC staff to ensure that agency resources are appropriately applied and that activities are prioritized according to their importance to public health and safety.

On October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016."

As the NRC works to achieve this goal, the Commission and staff also remain committed to balancing the application of resources to address lessons learned from the Fukushima event with day-to-day activities necessary to ensure continued safe operation of U.S. nuclear power plants and the completion of other important safety enhancements not related to lessons learned from Fukushima.

The NRC agrees that licensees should implement all of the Tier 1, high-priority actions without unnecessary delay. The NRC's Near Term Task Force (NTTF) concluded, and the NRC staff agreed, that continued operation of U.S. nuclear power plants does not pose an imminent risk to public health and safety. Many of the plant modifications necessary to implement the requirements of the orders must be made when the reactor is shut down. This allows operators, engineers and maintenance crews to access areas normally off limit during plant operation to collect design information, access options for implementing enhancements, and, ultimately, install the necessary modifications. Accordingly, the schedules established in the issued orders require licensees to "complete full implementation no later than two refueling cycles, or by December 31, 2016, whichever comes first." The NRC staff expects that licensees will use the first refueling outage to collect the necessary information to design and engineer the safety enhancements and modifications that will be installed during the second outage. This schedule will lead to many plants achieving full compliance with the orders as early as 2014, and all plants by 2016.

The staff is closely monitoring the industry's efforts to ensure that the Tier 1 actions are assessed properly and completed as expeditiously, and as safely as possible. To facilitate this monitoring, the NRC required, via the orders, each nuclear power plant licensee to submit periodic status reports of its progress in implementing the new requirements.

Significant work on the Tier 2 recommendations can only begin after the agency has collected information from the Tier 1 activities and when resources currently devoted to those activities become available. Additionally, the NRC staff will provide the Commission with a plan for undertaking the remaining, longer-term Tier 3 activities in July 2012.

As the NRC proceeds with obtaining full compliance of the issued orders, the staff will ensure that all actions are transparent and open to the public. The staff will conduct several additional public meetings this summer associated with implementation of the Tier 1 actions so that stakeholders will have the opportunity to better understand industry's current plans and actions. The staff will also solicit stakeholder feedback (e.g., meeting feedback forms, the NRC's web site, or the established public e-mail account) for all of the staff's proposed regulatory actions.

Senator Inhofe

QUESTION 1: **Carol Browner, a former White House top advisor, recently stated "I'm concerned that if we don't build new nuclear plants we'll lose the engineers, scientists and construction workers with the know-how." China has stated that it plans to generate five times the amount of nuclear energy it currently produces. With such an aggressive push, China is now building almost as many nuclear reactors as the rest of the world combined.**

a. **Would you agree that if nuclear licensing and relicensing actions continue to be tied up in litigation and excessive delays we will effectively be allowing China to carve out a larger worldwide market share for the use of civil nuclear technologies?**

b. **Would you agree that national security interests in the United States are lessened if China becomes the dominant supplier of civil nuclear components and services?**

The Commission's number one focus is on our mission: to license and regulate the Nation's civilian use of byproduct, source, and special nuclear materials to ensure the adequate protection of public health and safety, promote the common defense and security, and protect the environment. While we develop and maintain solid working relationships internationally in the global regulatory community, the NRC does not engage in endorsing nuclear energy or weigh in on the dynamics of global markets.

QUESTION 2. **I understand that the Fukushima units that were operating last March had shut down or were in the process of safely shutting down after the earthquake, and that it wasn't until the tsunami inundated the site that on-site power was lost. There were other recent earthquakes both in Japan (2007) and in the U.S. (2011) where plants shut down as designed following large, historic earthquakes with little or no damage to safety systems or plant structures. Given this operating experience, what is the Commission's view on the robustness of U.S. plants with respect to seismic hazards?**

Answer.

Operating nuclear power plants in the United States are designed to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. In addition, the design practices for nuclear power plants result in an additional seismic design margin. This conclusion was confirmed by the results of the program for "Individual Plant Examination of External Events" (IPEEE). In the mid-to-late1990s, the NRC staff reviewed the plants' assessments of potential consequences of earthquakes, including those larger than the maximum historical earthquake for the region surrounding each plant, which licensee performed as part of the IPEEE program. As a result of the IPEEE program, additional enhancements were made to a number of plants. From this review, the NRC staff confirmed that the seismic designs of operating plants have additional safety margins to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. The recent earthquake in Mineral, Virginia, further confirmed this conclusion, as the North Anna plant safely shut down and there was no damage to the safety-related portions of the plant and very minor damage elsewhere on the site. In response to the accident at the Fukushima Dai-ichi nuclear

power plant caused by the March 11, 2011, Tōhoku earthquake and tsunami, the NRC has issued a request to licensees of operating nuclear power plants to reevaluate seismic hazards for their sites using updated seismic information.

QUESTION 3. **Fukushima-related orders and requests for information issued to power reactor licensees appear to require substantial engineering and analytical resources. Do you believe there are sufficient industry and agency resources, especially in the external hazard areas, such as seismic and flooding, to adequately perform and review the analyses in the timeframe given?**

Answer.

The NRC believes that licensees and the agency have adequate resources to perform the associated work for each of the nuclear power plants in the U.S. within the schedules outlined in the requests for information issued in March 2012. The NRC is currently engaging stakeholders on the implementation guidance that we are considering related to evaluation of the current hazards and potential risks posed by flooding and seismic events. The NRC staff will evaluate each licensee's response to the requests for information and take additional regulatory action, as necessary, to facilitate a consistent approach that may help reduce the resources required to carry out all of the reevaluations.

The NRC staff has acknowledged, however, that there are identified factors associated with completion of the seismic analysis that may challenge the completion schedule desired by the Commission. For example, limited national expertise exists (for industry, licensees, and other stakeholders) to perform the detailed probabilistic safety analyses of seismic hazards. This may require that the re-evaluations be sequenced. Therefore, the NRC will review seismic hazard evaluations provided by its licensees and prioritize U.S. plants such that completed risk evaluations begin to be submitted in 2017.

QUESTION 4. **Has the Commission completed a review of the differences between the regulatory requirements and oversight in Japan versus what we do here in the United States? Can you share with the Committee what you believe to be significant differences and what they might mean with respect to the protection of the U.S. plants?**

Answer.

NRC has not conducted a formal review of the differences between the regulatory and oversight requirements in Japan and those in the U.S. The staff continues to monitor the events at Fukushima Dai-ichi in order to confirm that current regulatory requirements and existing plant capabilities allow for the determination that a sequence of events like the Fukushima Dai-ichi accident is unlikely to occur in the U.S. Consistent with the NRC's mission, the NRC staff will continue to monitor all lessons-learned activities developed by domestic stakeholders and international counterparts to ensure that information from all available sources in considered in applying lessons learned to U.S. plants. To date, the NRC staff has learned from Japanese counterparts that they are looking to implement several actions in the near term to ensure that their nuclear power plants continue to operate safely. Reports indicate that the Japanese are currently looking to restructure their regulatory body to emulate the NRC/Department of Energy model established by the Energy Reorganization Act of 1974. This change would separate the promotion of atomic energy from its regulation. Additionally, the Japanese have indicated that they are planning to implement many of the regulations for large area fires and explosions that the NRC implemented after the tragedies of September 11, 2001. Had these measures been in place at Fukushima Dai-ichi, additional equipment and strategies may have been available to help mitigate the effects of the earthquake and tsunami.

QUESTION 5. **For over six years, the NRC has been considering the license renewal application for the Pilgrim plant. This situation defies the NRC's Efficiency Principle of Good Regulation which states "Regulatory decisions should be made without undue delay." What would you say to Pilgrim's 650 employees who are wondering right now what their intermediate and long term employment prospects at Pilgrim are given the NRC's dismal record, even given that so-called "timely renewal" provisions allow operation after their license expires on June 8th? These people are wondering whether they will be able to provide for their families and pay their mortgages. When will you be able to give them an answer?**

ANSWER.

[NOTE: This response is current as of April 2012, when it was prepared by staff for review by the Chairman's office.]

The NRC's goal in contested license renewal proceedings is to conclude its review within 30 months from the receipt of the application. However, we are mindful of our responsibility under the Atomic Energy Act, the Administrative Procedure Act, and the Commission's rules to ensure a fair opportunity for public participation in that process. Where an individual or entity establishes that it has standing to request a hearing, (*i.e.*, the person shows that its interests could be adversely affected) and includes at least one admissible contention (a specific issue of law or fact, supported by fact or expert opinion, and material to the NRC's licensing decision), NRC regulations afford that person an opportunity for a hearing on the license renewal application.

With respect to Pilgrim, the case has presented a number of highly complex technical issues and novel legal questions for the Licensing Boards and the Commission. The schedule for estimated completion of the typical license renewal review process serves as a guide, but such expectations must be flexible enough to allow for resolving unique safety or environmental issues that may arise on a case-by-case basis. Accordingly, the actual time needed to complete the adjudicatory hearing depends upon a number of factors including the nature and complexity of the legal, technical, environmental, and factual issues involved.

Consistent with the NRC's regulations, the Administrative Procedure Act, and the timely renewal provisions, the pendency of a hearing does not affect the licensee's ability to continue to operate the facility. The NRC has developed a comprehensive regulatory process and procedures for evaluating nuclear power reactor license renewal applications to ensure the continued protection of public health and safety if a renewed nuclear reactor operating license is issued. Employment decisions by a licensee are a function of the licensee, whether those decisions occur during its current operations or during a period of extended operations under timely renewal.

QUESTION 6. **Orders have been issued implementing post-Fukushima Tier 1 measures. Please describe whether these measures will make quantifiable improvements in the safety of our nuclear plants and how those improvements have been quantified.**

a. If the benefits from the orders cannot be measured, please describe your rationale for imposing those requirements.

Answer.

It is not possible to quantify precisely the safety benefits that will result from the implementation of the recently-issued orders regarding spent fuel pool instrumentation, boiling water reactor hardened vents, and mitigating strategies for beyond design basis events. The NRC issues orders where necessary to provide "reasonable assurance of adequate protection to the public or common defense and security." The Commission may also issue orders where the requirements of the order would result in a substantial increase in overall protection of public health and safety or the common defense and security, and the direct and indirect costs of implementation of the requirements are justified in view of the increase protection. As a result of the NRC's assessment of new insights from the events at Fukushima Dai-ichi, the NRC staff concluded that additional requirements should be imposed on licensees to increase the capability of nuclear power plants to withstand natural events beyond what they were originally designed to endure. The Commission approved the NRC staff's proposed requirements (Tier 1 items) and the implementation plan, as described in an October 3, 2011, policy paper to the Commission. The Commission directed that the Tier 1 items be implemented by the NRC staff without unnecessary delay. The Tier 1 items include three orders:

1) Mitigation Strategies Order – This order was modeled on Near-Term Task Force (NTTF) Recommendation 4.2, but was substantially enhanced in response to public feedback. It was

issued to all reactor licensees, including holders of construction permits and of combined licenses (COLs). These licensees are required to develop strategies to withstand natural events beyond what plants were designed to endure, addressing multi-unit events and providing reasonable protection of equipment identified under such strategies.

2) Reliable Hardened Containment Vents Order – This order was modeled on NTTF Recommendation 5.1, but was enhanced by public feedback. It was issued to all reactor licensees operating boiling water reactors (BWRs) with Mark I and Mark II containments. Each of these plants is required to have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following natural events beyond what plants were designed to endure that result in the loss of active containment heat removal capability or prolonged station blackout.

3) Spent Fuel Pool Instrumentation Order – This order was modeled on NTTF Recommendation 7.1, but was enhanced by public feedback. It was issued to all reactor licensees, including holders of construction permits and of COLs. These licensees are required to have reliable indications of the water level in associated spent fuel storage pools capable of supporting identification of pool water level conditions by trained personnel.

The Commission approved the issuance of these Orders on March 9, 2012 based on (1) ensuring adequate protection under 10 C.F.R. § 50.109(a)(4)(ii) for "Mitigation Strategies for Beyond-Design Basis External Events" and "Reliable Hardened Containment Vents (Mark 1 and II BWRs);" and (2) an administrative exemption to the Backfit Rule under 10 C.F.R. § 50.109(a)(4)(ii) and the issue finality requirements in 10 C.F.R § 52.63 for "Reliable Spent Fuel Pool Instrumentation." The Commission stated, in the Federal Register notice announcing issuance of the spent fuel pool instrumentation order, that the order represents a qualitative

determination that such instrumentation "represents a significant enhancement to the protection of public health and safety and is an appropriate response to the insights from Fukushima Dai-ichi." 77 FR 16082 at 16084; March 19, 2012.

b. Was a cost-benefit analysis, such as that required by the NRC's backfit rule utilized for any of the new requirements? If not, why?

Answer.

The Commission's approval of the issuance of these orders was based on: 1) ensuring continued adequate protection under 10 C.F.R. § 50.109(a)(4)(ii) for requiring plants to develop strategies to deal with beyond-design-basis extreme natural phenomena and demonstrating there are reliable, hardened vents in BWR plants with Mark I and II containment designs; and 2) an administrative exemption to the Backfit Rule, 10 C.F.R. 50.109, and the issue finality requirements in 10 C.F.R. 52.63 and 10 C.F.R. Part 52, Appendix D, Paragraph VIII , for requiring the installation of enhanced, reliable spent fuel pool instrumentation. As such, the basis for the NRC's issuance of these orders did not rely on, or require, a comparison of cost versus expected benefits.

c. How did each of you determine the amount of time that would be necessary for licensees to comply with the new requirements?

Answer.

The NTTF concluded and the staff agreed that continued operation of nuclear power plants does not pose an imminent risk to public health and safety. Consequently, the NRC should identify prudent safety enhancements with appropriate dispatch but without shortchanging the thoroughness and deliberation of our response. On October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." The NRC staff has worked diligently with stakeholders to establish reasonable timeframes for licensees to comply with the new Tier 1 requirements.

In evaluating potential implementation schedules, the NRC considered the complexity of the technical and engineering issues involved, as well as other important safety enhancements being implemented by licensees beyond those related to lessons learned from Fukushima, and input from external stakeholders. Many of the plant modifications necessary to implement the requirements of the issued orders must be made when the reactor is shutdown. This allows operators, engineers and maintenance crews to access areas normally off-limits during plant operation so that they may collect design information, assess options for implementing enhancements, and ultimately, install the necessary modifications. Accordingly, the NRC established schedules that supported implementation of the new requirements during routine refueling outages at each nuclear power plant. To support the established schedules, the NRC staff anticipates issuing implementation guidance for the Tier 1 Orders by August 31, 2012. Each licensee will be required to achieve full compliance within two refueling cycles after the issuance of the guidance, or by December 31, 2016, whichever comes first. The NRC staff has

been engaging licensees and stakeholders on the development of new requirements, and their implementing timeframes, and will continue these engagements as implementation guidance is developed and made final.

d. Did you consider whether the cumulative effects of complying with the new requirements could distract licensees from other important safety functions? How were these competing considerations balanced?

Answer.

The NRC staff has considered the cumulative effects of complying with the new requirements and has been focused over the past year on making the necessary enhancements (i.e., revising regulatory requirements and strengthening existing plant capabilities) in a systematic, prioritized, and methodical manner. The NRC has considered the implementation of the Fukushima lessons-learned items in the context of its existing workload so that important safety issues are not unduly impacted or delayed. The NRC has also worked diligently with stakeholders to establish reasonable timeframes and expectations for licensees to comply with the new Tier 1 requirements. With the passage of time, new information may also become available. Some of this information may cause modifications to the approaches being taken to implement lessons learned.

QUESTION 7. **Explain the Commission's concern with, and program in place to monitor, cumulative effects of the broad reach and great number of regulatory initiatives that are not limited to the staff's and industry's post-Fukushima efforts.**

Answer.

This is a matter that remains under active Commission consideration. A cognizance of the cumulative effects of regulation (CER) is intended to avoid actions that may distract regulated entities from executing other primary duties with the requisite safety and security. On October 11, 2011, the Commission approved several rulemaking process enhancements proposed by the NRC staff to reduce CER. These enhancements included increased interaction with external stakeholders through the rulemaking process (including a public meeting during the final rule stage to discuss implementation issues), issuing guidance with rules, and requesting public feedback as part of the rulemaking process so that CER can be addressed. The staff is planning to conduct a public meeting in late May 2012 to obtain external stakeholder feedback on the CER activities.

Practical limitations impacted the extent to which CER-principles were applied to the post-Fukushima orders and requests for information. Notwithstanding those limitations, the NRC incorporated extensive public interaction into the development of the orders and requests for information. The NRC intends to maintain a high level of public interaction throughout the implementation of the post-Fukushima regulatory actions. External stakeholders will have the opportunity to make the NRC aware of implementation challenges throughout the rulemaking process. The NRC is increasing its interaction with stakeholders during the regulatory basis phase of a rule, and each proposed rule *Federal Register* notice will include CER-related

questions that seek feedback on implementation challenges. Finally, the NRC will conduct a public meeting focused on the rule's implementation during the final rule stage to ensure the NRC understands the unique implementation challenges that each rule presents to help a reasonable implementation timeframe.

Senator Barrasso

1. **Would you ever, under any circumstances, tell the White House about concerns you had about any of your fellow commissioners? Have you done so? If so, do you believe that action would compromise your ability to serve on the Commission?**

2. **Have you or your staff ever taken any action(s) at the Commission that violated Commission procedures? If so, please list all instances, the date those occurred and what action you took to right the violation.**

3. **Have you ever withheld information from the Commissioners, or directed your staff to do so? If so, please list all instances and the date those actions occurred.**

4. **Senator Inhofe asked Commissioner Magwood in his December 15th, 2011 questions for the record to "Please describe all the situations where you are concerned that information was withheld from the Commission, delayed or altered prior to transmittal to the Commission. In his response, Magwood stated –**

   "it has become more or less routine for staff information to be altered, delayed, or blocked from the Commission."

   Magwood cited specific examples that he stated were:

   "salient instances that raised concerns that vital information related to important policy matters was withheld from the Commission or was delayed or altered prior to transmittal to the Commission."

   Magwood went on to say –

   "A very notable example relates to the Near Term Task Force Report provided to the Commission regarding potential actions to be taken in the wake of the Fukushima disaster. Staff provided the Commission with an advance copy of a transmittal memo which had been signed by the EDO which provided his usual

detailed discussion regarding the senior staff's recommended next steps. This discussion culminated in a recommendation from the senior staff that there may be value in evaluating the entire body of recommendations in a holistic manner. However, to the Commissioners' surprise, that advance copy was withdrawn and a memo that simply transmitted the Task Force report without any input from the agency's senior managers. It is my understanding that withdrawal of the advanced copy of the memorandum was undertaken at the direction of the Chairman. In fact, we later learned that the Chairman's staff – and not the EDO – actually wrote the final version of the memo that was transmitted to the Commission. This action was not consistent with the Commission's procedures."

Did you, or your staff at your direction, withdraw the advanced copy of the transmittal memo, signed by the EDO as Commissioner Magwood describes?

If so, why?

Did you feel this action violated Commission procedures?

5. **Commissioner Magwood, in his February 28th, 2012 written responses to Ranking Member Inhofe from the December 15th, 2011 hearing, stated a second example where he believed information was withheld by Commissioners –**

"A second notable example is related to the policy issue associated with fire protection at nuclear power plants. In late 2010, I was told by a member of the senior staff that the agency's approach to receiving applications from industry to risk-inform fire protection programs at nuclear power plants was proving to be unworkable and staff was developing a notation vote paper to request Commission direction on a revised strategy. I later asked the Chairman what progress the staff had made developing this paper and the Chairman said there was no paper. Several weeks passed and no progress had been made to resolve this critical fire safety issue. In order to clarify the situation, another Commissioner and I requested a briefing from the staff to understand the details of the problem and what the staff thought should be done. However, just before the briefing began, the Chairman dispatched a manager to stop the briefing. Evidently, the Chairman had seen a copy of the staff's briefing and didn't want the information presented to us. We refused to stop the briefing, but the attempt to prevent us from obtaining staff input was disturbing. Minutes after the failed attempt to stop the briefing, the Chairman announced that staff would provide the Commission with a paper to address the fire issue."

Did you attempt to prevent the Commissioners from having the briefing mentioned above? If so, why?

Was there a notation vote paper being developed prior to the briefing that you tried to stop?

6. **The House Oversight and Investigations Committee released a report in December 13, 2011 entitled "A Crisis of Leadership: How the Actions of Chairman Gregory Jaczko Are Damaging the Nuclear Regulatory Commission." The report made 14 findings on pages 6 and 7. Below are the findings.**

Which of these 14 findings do you disagrees with? Please list the findings and the specific reason why you disagree or agree with that finding.

Finding: Chairman Jaczko and his staff used political considerations to try to intimidate and influence other Democratic Commissioners' votes on matters related to Yucca Mountain.

Finding: Chairman Jaczko's Chief of Staff suggested that Commissioner Magwood, a Democrat appointed by President Obama, should be concerned that his vote in favor of an Action Memorandum that would have continued work on Yucca Mountain might leak and be viewed as a lack of support for the Administration.

Finding: When Chairman Jaczko did not get the support of his fellow Commissioners for a post-Fukushima review roadmap proposal, he stormed out of an agenda planning meeting and announced his plan at a speech at the National Press Club.

Finding: Chairman Jaczko strategically withheld information to gain the support of his Democratic colleagues for his plan to end the staff's technical review of the Yucca Mountain license application. His actions undermined the trust of his fellow Commissioners.

Finding: Chairman Jaczko's aggressive behavior and attempts to threaten or intimidate his colleagues prevents constructive discussion among Commissioners and undermines the NRC's deliberative process.

Finding: Rather than trying to work with his colleagues to improve communications and restore a constructive relationship, Chairman Jaczko became increasingly defiant and exposed more of the NRC staff to the toxic environment present at the Commission level.

Finding: Chairman Jaczko's tendency to game the system has forced his colleagues to rely on formal votes to move the NRC on matters that traditionally were handled

informally. The need to use the formal voting process to play defense against the Chairman has made it difficult for the Commission to carry out its basic functions.

Finding: Chairman Jaczko has sought to leverage his supervisory authority over the staff to pressure them to support his policy objectives.

Finding: Chairman Jaczko became "shaking angry" and accused the Deputy Executive Director for Operations of being dishonest when a vote paper delivered to the Commission did not conform to his desires, interests, or views. Staff had already significantly altered the paper to conform to the Chairman's vision.

Finding: Chairman Jaczko used his supervisory authority to berate and compel staff to withdraw a voting paper that – although consistent with the expectations of his colleagues – included a suggestion, not even a recommendation. That was contrary to his preferred course of action. His actions deprived his colleague, and the public, of information that would help inform the Commission's consideration of the task force recommendations.

Finding: Chairman Jaczko demanded that career NRC staff support his positions when discussing policy matters with his fellow Commissioners. Staff no longer felt that they could provide independent, unbiased advice to the other Commissioners.

Finding: Chairman Jaczko stated an expectation that he should see voting papers before they are shared with his colleagues. Having prior access to voting papers would allow the Chairman to pressure staff to pull back or otherwise edit papers contrary to his policy priorities. This instruction represented a "defining moment" for the Deputy Executive Director for Operations.

Finding: Chairman Jaczko pressured staff to support his policy priorities in order to gain leverage over his colleagues on the Commission.

Finding: Four Commissioners wrote a letter to the White House explaining their concerns about Chairman Jaczko's leadership. They told the White House that he has "intimidated and bullied career staff," created a "chilled work environment," undermined and disrespected the Commission, and created a situation that "will adversely affect the NRC's essential mission to protect the health, safety, and security of the American people."

RESPONSE TO SENATOR BARRASSO:

Responses to these questions specific to his tenure were not prepared before Chairman Jaczko left the Commission. Chairman Macfarlane would welcome the opportunity to meet with you to discuss her approach to leadership, working with her fellow Commissioners, and taking lessons-learned from past events.

Attachment 2

Updates on San Onofre Nuclear Generating Station, Fukushima, and Pilgrim Nuclear Power Station

San Onofre Nuclear Generating Station

On June 18, 2012, the NRC Augmented Inspection Team completed its inspection activities of the steam generator tube issues at the San Onofre Nuclear Generating Station, Units 2 and 3. The team identified 10 items requiring additional review for regulatory action. The results of the Augmented Inspection are documented in NRC Inspection Report 05000361/2012007 and 05000362/2012007. The inspection reports are publicly available in the NRC's Agency Documents Access and Management System (ADAMS) at accession number ML12188A748.

The Augmented Inspection Team Report identified one follow-up item associated with Southern California Edison's (SCE) 10 CFR 50.59 evaluation. Two instances were identified that involved a potential departure from the method of evaluation described in the updated final safety analysis report, but were not screened as requiring NRC prior approval. Overall, the team determined that no significant differences existed in the design requirements of Unit 2 and Unit 3 replacement steam generators. Based on the updated final safety analysis report description of the original steam generators, the team determined that the steam generators major design changes were reviewed in accordance with the 10 CFR 50.59 requirements.

Fukushima

The public comment period for the advanced notice of proposed rulemaking (ANPR) to solicit public input on the station blackout (SBO) rulemaking closed May 4, 2012, and the NRC is currently reviewing the public input it received. Another ANPR on the integration of emergency procedures at nuclear power plants was issued April 18, 2012, and the public comment period closed June 18, 2012. The NRC is currently reviewing these comments as well.

On July 13, 2012, the NRC staff provided the Commission a Commission Paper, SECY-12-0095, Tier 3 Program Plans and 6-Month Status Update in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Subsequent Tsunami, that addressed all of the longer term action items, including the staff's plans for addressing the remaining, longer-term Tier 3 activities. Enclosure 1 to SECY-12-0095 includes tables outlining a description of all Japan lessons learned action items and long-term evaluations, as well as a timeline for Tier 1 recommendations. The plan for each Tier 3 item is unique, but many of the Tier 3 plans will use information gathered from the Tier 1 activities to inform further action. The NRC will provide information on its public website regarding the progress being made by each licensee toward addressing major milestones associated with each Tier 1 action.

SECY-12-0095 also provided additional information to the Commission on the staff's proposed plan to review EPZ size.

The Japanese government has announced that the new Japanese Nuclear Regulatory Authority (JNRA) will replace the existing Nuclear and Industrial Safety Authority (NISA) by September 2012. It is our understanding that the scope of authority, independence, and commission structure of the JNRA will be similar to that of the NRC.

Pilgrim Nuclear Power Station

In a Staff Requirements Memorandum dated May 25, 2012, the Commission authorized the Director of the Office of Nuclear Reactor Regulation to renew the operating license for the Pilgrim Nuclear Power Station upon his making the appropriate findings on safety and environmental matters. In so doing, the Commission noted that if the renewed license is subsequently set aside on appeal, the previous operating license would be reinstated in accordance with 10 CFR 54.31(c). The Director of the Office of Nuclear Reactor Regulations issued the renewed license on May 29, 2012.

In a Staff Requirements Memorandum dated May 25, 2012, the Commission authorized the Director of the Office of Nuclear Reactor Regulation to renew the operating license for the Pilgrim Nuclear Power Station upon his making the appropriate findings on safety and environmental matters. In so doing, the Commission noted that if the renewed license is subsequently set aside on appeal, the previous operating license would be reinstated in accordance with 10 CFR 54.31(c). The Director of the Office of Nuclear Reactor Regulations issued the renewed license on May 29, 2012.

Emergency Planning Zone

For planning purposes, the NRC defines two forms of Emergency Planning Zone (EPZ). The Commission has defined: 1) a plume exposure pathway EPZ as an area of approximately 10 miles in radius, and 2) an ingestion pathway EPZ as an area of approximately 50 miles in radius around each nuclear power plant. The staff has conducted several studies that were useful in evaluating the adequacy of the plume exposure pathway EPZ in terms of protective action strategies, large evacuations, and hypothetical evacuations within and beyond the EPZ. The results of these studies have been published as NRC documents. They are (1) NUREG/CR 6953, "Review of NUREG-0654, Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents," which evaluated the efficiency of various protective action strategies within the EPZ; (2) NUREG/CR 6864, "Identification and Analysis of Factors Affecting Emergency Evacuations" examined large evacuation in the U.S. between 1990 and 2003 to more fully understand the dynamics involved; (3) Draft NUREG-1935 the "State of the Art Reactor Consequence Analysis" evaluated hypothetical evacuations with EPZs and beyond in response to a series of accident scenarios. SOARCA's main findings fall into three basic areas: how a reactor accident progresses, how existing systems and emergency measures can affect an accident's outcome, and how an accident would affect the public's health. The project's preliminary findings include:

- Existing resources and procedures can stop an accident, slow it down or reduce its impact before it can affect public health;
- Even if accidents proceed uncontrolled, they take much longer to happen and release much less radioactive material than earlier analyses suggested; and

- The analyzed accidents would cause essentially zero immediate deaths and only a very, very small increase in the risk of long-term cancer deaths.

These studies support the NRC's basis for concluding that the existing emergency preparedness framework and regulations, including the definitions of EPZs provide reasonable assurance of adequate protection of public health and safety in the event of a radiological emergency at a U.S. nuclear power plant. These analyses informed the staff's conclusion that the current requirements for EPZs remain protective of public health and safety.

In addition, in a 1979 policy statement, the NRC endorsed NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power.

These analyses informed the staff's conclusion that the current requirements for EPZs remain protective of public health and safety. In addition, in a 1979 policy statement, the NRC endorsed NUREG-0396, "Planning Basis for the Development of State and Local Government Radiological Emergency Response Plans in Support of Light Water Nuclear Power Plants," which provides bases for the 10-mile EPZ; including an assumption that the planning conducted for 10 miles would provide a substantial basis for expansion of the EPZ should it ever be necessary.

In the coming years, there are extensive plans to further study the potential health effects of the released radioactivity from the Fukushima site. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) plans a two-year assessment of Fukushima impacts; and a major initiative is planned, the Fukushima Health Survey, that will inform future, more detailed dose assessments by recreating the whereabouts of every Fukushima prefecture resident from the time of the March 11 nuclear accident onwards. The NRC staff will continue to monitor the results of these efforts, and their potential implications regarding the U.S. regulatory approach to emergency planning around nuclear power plants, including the EPZ size. In addition, the NRC is conducting a Level 3 Probabilistic Risk Assessment (PRA) to gain a better understanding of potential radiological effects of postulated accident sequences including sites with multiple units. Although the NRC believes the EPZ size is adequate (including for multi-unit events) and can be expanded as needed, the staff will inform the basis for the EPZ by the upcoming studies. This effort could take 3-4 years to complete.

Since the events of March 2011 at Fukushima Dai-ichi, the NRC staff has been focused on assessing the identified lessons-learned and making the necessary enhancements to its regulatory system in a systematic and methodical manner. The staff focused its emergency preparedness efforts in the areas of staffing and communications, as these items could be implemented without delay. In light of this, the NRC staff recommended that the EPZ size be reviewed as a longer-term activity to determine whether any enhancements to existing strategies are warranted. In December 2011, the Commission approved the staff's prioritization of those recommendations without significant schedule modification.

Senator BOXER. Thank you, Chairman.
And Hon. Kristine Svinicki.

STATEMENT OF HON. KRISTINE L. SVINICKI, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Ms. SVINICKI. Thank you, Chairman Boxer, Chairman Carper, Ranking Member Barrasso, and members of the Committee, for the opportunity to appear before you today on the topic of the NRC's implementation of recommendations for enhancing nuclear safety in the 21st century.

In his testimony on behalf of the Commission, Chairman Jaczko has described the progress that NRC has made to further strengthen nuclear power plant safety. I also join Chairman Jaczko in acknowledging the hard work of the NRC staff and their sustained efforts toward the progress that NRC has made to date. As he has described, we have now issued a series of orders to nuclear power plant licensees, which require features to mitigate beyond design basis extreme natural events, require hardened venting systems, and require greater capacity of measurement for spent fuel storage pool instrumentation.

We are also requiring that nuclear power plant licensees conduct system walk-downs by teams of relevant experts and undertake substantial reevaluation of seismic and flooding hazards at their sites using current NRC requirements. Licensees must also identify actions to address vulnerabilities found. The NRC will assess the results of these evaluations to determine whether additional regulatory actions are needed.

In implementing these recommendations the agency's broad set of stakeholders have been engaged through multiple public meetings. We have benefited from the insights and perspectives of nuclear operators, nuclear safety and environmental groups, and the public. I believe that all of these efforts have strengthened the NRC's activities in response to the Fukushima events and will continue to do so.

Additionally, as the NRC acquires more information about the accident we will assess the impact of such information on actions already underway and consider appropriate actions going forward.

Thank you, and I look forward to the Committee's questions.

[The responses of Ms. Svinicki to questions for the record follow:]

Environment and Public Works Committee Hearing
March 15, 2012
Follow-Up Questions for Written Submission

Questions for Svinicki

Questions from:

Senator Barbara Boxer

(1) *The Commission provided direction to the NRC staff to strive to complete all recommendations by 2016. However, the NRC's recent orders provide plant operators with more than five years to complete important seismic re-evaluations. What steps can the Commission take to ensure that the NRC completes these recommendations by 2016?*

The Commission's highest priority has been and continues to be a focus on regulatory activities associated with ensuring the safety and security of currently operating reactors. Consistent with the thorough and disciplined review that has been conducted to date on Fukushima lessons learned, the Commission has directed the NRC staff to ensure that agency resources are appropriately applied and that activities are prioritized according to their importance to public health and safety. The NRC staff has worked to establish schedules that are implementable, yet reflect the appropriate sense of urgency. As we move forward, the Commission will continue to look at these time frames and make adjustments, as appropriate.

Enclosure

(2) *The Task Force and the NRC staff concluded that the post-Fukushima recommendations are needed for the "adequate protection" of public health and safety. That means that these recommendations do not have to undergo a cost-benefit analysis to be implemented. Do you agree with the NRC staff's determination that the recommendations are needed for the "adequate protection" of public health and safety? If not, why not?*

Two of the orders resulting from the Tier 1 recommendations were issued under the "adequate protection" standard. The third order, regarding spent fuel pool instrumentation, was issued under an administrative exemption to the backfit rule. The requirements imposed by orders can be the same regardless of whether they are characterized as ensuring adequate protection, redefining adequate protection, or exercising an administrative exemption to the backfit rule. In deciding between these alternatives, the Commission assesses in each case whether the staff has sufficiently substantiated that regulatory action is necessary to ensure that the facility provides adequate protection of the health and safety of the public or, failing that, whether the circumstances merit the Commission availing itself of a rare, but available, administrative exception to its own backfit rule. In my vote in support of issuing these three orders, I would have invoked the administrative exception to the backfit rule for each of the three proposed orders and directed the staff to issue the orders – compelling the same actions of licensees – but upon this revised basis. Although I believe that the act of agencies "exempting" themselves from their own rules should be rare, in my view, the exigencies and policy imperatives of moving forward with dispatch on these three orders, which I considered to be prudent and well-reasoned regulatory actions, presented sufficient bases for invoking an administrative exception and waiving the requirement for a cost-benefit analysis.

Senator Tom Carper

(1) *You recently decided to grant new reactor licensees for the first time in 30 years to the Vogtle site in Georgia where two new reactors will be built. However, not all of you agreed on what the appropriate approach to addressing the Fukushima recommendations should be. Can each of you share your perspectives on that decision?*

I was part of the Commission majority supporting the *Vogtle* mandatory hearing decision that approved authorizing the issuance of the combined licenses. As the Commission has stated in recent adjudicatory decisions, the NRC has the regulatory tools and processes necessary to require implementation of Fukushima lessons-learned for both operating and new reactors. For that reason, I concluded that the combined licenses for Vogtle Units 3 and 4 need not include an across-the-board license condition requiring implementation of all Fukushima-related requirements prior to operation. To me, such an overly broad license condition – one mandating implementation of requirements that had yet to be developed – lacked the necessary concreteness and substance. Such an approach would not improve our systematic regulatory approach to the events at Fukushima, nor would it make, in my view, a difference in the operational safety of new reactors.

Senator James Inhofe

(1) *I understand that the Fukushima units that were operating last March had shut down or were in the process of safely shutting down after the earthquake, and that it wasn't until the tsunami inundated the site that on-site power was lost. There were other recent earthquakes both in Japan (2007) and in the U.S. (2011) where plants shut down as designed following large, historic earthquakes with little or no damage to safety systems or plant structures. Given this operating experience, what is the Commission's view on the robustness of U.S. plants with respect to seismic hazards?*

Operating nuclear power plants in the United States are designed to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. In addition, the design practices for nuclear power plants result in an additional seismic design margin. This conclusion was confirmed by the results of the program for "Individual Plant Examination of External Events" (IPEEE). In the mid-to-late 1990s, the NRC staff reviewed the plants' assessments of potential consequences of earthquakes, including those larger than the maximum historical earthquake for the region surrounding each plant, which licensees performed as part of the IPEEE program. As a result of the IPEEE program, additional enhancements were made to some plants. From this review, the NRC staff confirmed that seismic designs of operating plants have additional safety margins to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. The recent earthquake in Mineral, Virginia, further confirmed this conclusion as the North Anna plant safely shutdown and there was no measurable or significant damage to the plant. In response to the accident at the Fukushima Dai-ichi nuclear power plant caused by the March 11, 2011, earthquake and tsunami, the NRC has issued a request to licensees of operating nuclear power plants to reevaluate the seismic hazards for their sites using updated seismic hazard information.

(2) *Fukushima-related orders and requests for information issued to power reactor licensees appear to require substantial engineering and analytical resources. Do you believe there are sufficient industry and agency resources, especially in the external hazard areas, such as seismic and flooding, to adequately perform and review the analyses in the timeframe given?*

At the present time, it is not clear that there are sufficient, immediately-available, industry and agency resources to perform and review the external hazard assessments in the timeframes currently established. For example, the NRC staff and nuclear industry resource estimates for performing the assessment phase of the seismic re-evaluations varied by orders of magnitude. The NRC has encountered similar difficulties in underestimating the complexity or lack of maturity in certain risk assessment techniques in the course of its work on fire probabilistic risk assessment. As a result of these miscalculations, our review of license amendment requests for -- and licensees' transitions to -- NFPA 805 have been delayed from NRC's original estimates. With respect to Fukushima-related orders and requests for information, the NRC staff has been engaging licensees and stakeholders on the implementation guidance the NRC is considering issuing, regarding the current hazards and potential risks posed by flooding and seismic events. The staff hopes to facilitate a consistent approach to these assessments among licensees that may help reduce the resources required to carry out the re-evaluations. The Commission should continue to monitor these, and other, implementation issues closely.

(3) *Has the Commission completed a review of the differences between the regulatory requirements and oversight in Japan versus what we do here in the United States? Can you share with the Committee what you believe to be significant differences and what they might mean with respect to the protection of the U.S. Plants?*

The NRC has not conducted a formal review of the differences between the regulatory and oversight requirements in Japan and the United States. In my July 19, 2011 vote on SECY-11-0093, "Near-Term Report and Recommendations for Agency Actions Following the Events in Japan," I wrote that "the Commission's review of any proposed regulatory changes must, in my view, be informed by a comparison of U.S. and Japanese regulatory requirements, focused on those areas most relevant to the initiating sequence of events at Fukushima, but also comparing regulatory requirements regarding mitigation capability. Without this comparison, NRC's post-Fukushima response will lack a strong basis for determining the adequacy of, or strengthening, where necessary, the U.S. nuclear regulatory framework." While the proposal to conduct this review was not supported by a majority of the Commission, I continue to believe that such a review would strengthen the NRC's Fukushima lessons learned process.

(4) *For over six years, the NRC has been considering the license renewal application for the Pilgrim plant. This situation defies the NRC's Efficiency Principle of Good Regulation which states "Regulatory decisions should be made without undue delay." What would you say to Pilgrim's 650 employees who are wondering right now what their intermediate and long term employment prospects at Pilgrim are given the NRC's dismal record, even given that so-called "timely renewal" provisions allow operation after their license expires on June 8th? These people are wondering whether they will be able to provide for their families and pay their mortgages. When will you be able to give them an answer?*

The NRC's goal in contested license renewal proceedings is to conclude its review within 30 months from the receipt of the application. However, we are mindful of our responsibility under the Atomic Energy Act, the Administrative Procedure Act, and the Commission's rules to ensure a fair opportunity for public participation in that process. Where an individual or entity establishes that it has standing to request a hearing, (*i.e.*, the person shows that its interests could be adversely affected) and includes at least one admissible contention (a specific issue of law or fact, supported by fact or expert opinion, and material to the NRC's licensing decision), NRC regulations afford that person an opportunity for a hearing on the license renewal application.

With respect to Pilgrim, the case has presented a number of highly complex, and novel, technical issues of first impression for the licensing boards and the Commission, as well as novel legal questions. The schedule for the estimated completion of the typical license renewal review process serves as a guide, but such expectations must be flexible enough to allow for resolving unique safety or environmental issues that may arise on a case-by-case basis. Accordingly, the actual time needed to complete the adjudicatory hearing depends upon a number of factors including the nature and complexity of the legal, technical, environmental, and factual issues involved.

(5) *Orders have been issued implementing post-Fukushima Tier 1 measures. Please describe whether these measures will make quantifiable improvements in the safety of our nuclear plants and how those improvements have been quantified.*

a. *If the benefits from the orders cannot be measured, please describe your rationale for imposing those requirements.*

It is not possible to quantify precisely the safety benefits that will result from the implementation of the recently-issued orders regarding spent fuel pool instrumentation, boiling water reactor hardened vents, and mitigating strategies for beyond design basis events. In my vote approving the orders, I noted that the Commission had before it a very thoroughly examined and considered set of regulatory actions. I concluded that this set of regulatory actions was prudent and well-reasoned and that the Commission should move forward with dispatch on these actions.

b. *Was a cost-benefit analysis, such as that required by the NRC's backfit rule utilized for any of the new requirements? If not, why?*

As I noted in my response to question (5)a, I concluded that this set of regulatory actions was prudent and well-reasoned, and that the Commission should move forward with dispatch on these actions. I supported issuing the orders under an administrative exemption to the backfit rule, which obviated the requirement to perform cost-benefit analyses.

c. *How did each of you determine the amount of time that would be necessary for licensees to comply with the new requirements?*

Ever since the accidents at Fukushima, the Commission has maintained its conclusion that continued operation of U.S. nuclear power plants does not pose an imminent risk to public health and safety. Consequently, the NRC should identify prudent safety enhancements with appropriate dispatch but without shortchanging the thoroughness and deliberation of our response. The NRC staff considered the complexity of the technical and engineering issues involved, as well as other important safety enhancements being implemented by licensees beyond those related to lessons learned from Fukushima. The NRC staff has been engaging licensees and stakeholders on the development of new requirements, and their implementing timeframes, and will continue these engagements as implementation guidance is developed and made final.

d. *Did you consider whether the cumulative effects of complying with the new requirements could distract licensees from other important safety functions? How were these competing considerations balanced?*

Yes. In addition to urging prioritization of activities on the basis of their importance to safety, I have advocated that the NRC staff should remain engaged with our stakeholders to assure, among other things, that the NRC's activities regarding Fukushima lessons learned will not cause operators' safety focus to be impacted negatively. With the passage of time, new information will also become available. Some

of this information may cause modifications to the approaches being taken to implement lessons learned. These modifications should be prioritized according to their importance to safety and their cumulative impacts on regulatory activities.

(6) *Explain the Commission's concern with, and program in place to monitor, cumulative effects of the broad reach and great number of regulatory initiatives that are not limited to the staff's and industry's post-Fukushima efforts.*

A cognizance of the cumulative effect of regulation (CER) is intended to allow informed decision-making and the avoidance of actions that may distract regulated entities from executing other primary duties with the requisite safety and security. In SECY-11-0032, "Consideration of the Cumulative Effects of Regulation in the Rulemaking Process," dated March 2, 2011, the staff proposed several rulemaking process enhancements to reduce CER. These enhancements included increased interaction with external stakeholders through the rulemaking process (including a public meeting during the final rule stage to discuss implementation issues), issuing guidance with rules, and requesting stakeholder feedback as part of the rulemaking process so that CER can be addressed. The Commission approved these enhancements and gave additional direction in its associated staff requirements memorandum. The staff is planning to conduct a public meeting in late May 2012 to obtain external stakeholder feedback on the CER activities.

Practical limitations impacted the extent to which CER principles were applied to the post-Fukushima orders and requests for information. Notwithstanding those limitations, the NRC incorporated extensive public interaction into the development of the orders and requests for information. The NRC intends to maintain a high level of public interaction throughout the implementation of the post-Fukushima regulatory actions. To the extent practicable, the NRC will consider these actions when determining the implementation schedules of non-Fukushima related rules. External stakeholders will have the opportunity to make the NRC aware of implementation challenges through the rulemaking process. The NRC is increasing its interaction with stakeholders during the regulatory basis phase of a rule, and each proposed rule *Federal Register* notice will include CER-related questions that seek feedback on implementation challenges. Finally, the NRC will conduct a public meeting focused on a rule's implementation during the final rule stage to ensure the NRC understands the unique implementation challenges that each rule presents and allows a reasonable implementation timeframe.

Senator BOXER. Thank you very much, Commissioner.
Hon. George Apostolakis.

STATEMENT OF HON. GEORGE APOSTOLAKIS, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Mr. APOSTOLAKIS. Chairman Boxer, Chairman Carper, Ranking Member Barrasso, and members of the Committee, good morning.

As I reflect on the lessons from Fukushima 1 year after the accident I find that my views have evolved. The first time I testified on this subject before you, I indicated that the accident was a lesson in humility. I said that as a community of safety analysts. We had been pretty confident that there would be no new surprises, but Fukushima challenged that belief.

As more information was obtained, I then said the accident was not of extremely low probability, it was not unthinkable, it was not unforeseen. Today I can report that others have reached a similar conclusion. For example, the report issued by the Carnegie Endowment for International Peace last week states, "The plant would have withstood the tsunami had its design previously been upgraded in accordance with state of the art safety approaches."

Furthermore, a report by the American Nuclear Society Special Committee on Fukushima also issued last week states, "The committee believes that in responding to the accident at the Fukushima Dai-ichi plant human error and flaws in governance and regulatory oversight contributed to the severity of the accident."

In light of these observations it is reassuring to know that the NRC is a strong and independent regulator, our decisionmaking progress is open and transparent, and we have long recognized the importance of a positive safety culture. However, there are still lessons to be learned from the accident. For example, we are requiring all operating plants to reevaluate their design bases and strengthen mitigation strategies for external events, taking into account all units at the site.

I am pleased with the progress the Commission has made as well as the fact that the process for reaching decisions has been transparent and methodical. I continue to work with my fellow commissioners to apply the lessons learned from Fukushima.

Thank you very much.

[The responses of Mr. Apostolakis to questions for the record follow:]

Commissioner George Apostolakis
U.S. Nuclear Regulatory Commission
Responses to Questions for the Record from
Environment and Public Works Committee Hearing on:
"Lessons from Fukushima One Year Later: NRC's Implementation of Recommendations for Enhancing Nuclear Reactor Safety in the 21st Century"

Questions from Senator Barbara Boxer

1. *The Commission provided direction to the NRC staff to strive to complete all recommendations by 2016. However, the NRC's recent orders provide plant operators with more than five years to complete important seismic re-evaluations. What steps can the Commission take to ensure that the NRC completes these recommendations by 2016?*

Answer:

The NRC has been focused over the past year on (1) assessing the identified lessons-learned from Japan's March 11, 2011, Great Tōhoku Earthquake and subsequent tsunami; and (2) making the necessary enhancements to its regulatory system in a systematic and methodical manner. The NRC staff continues to take action on the identified improvements.

In the staff requirements memorandum (SRM) for SECY-11-0124, "Recommended Actions to be Taken without Delay from the Near-Term Task Force Report," dated October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years -- by 2016." The NRC remains committed to this goal. As the NRC works to achieve this goal, the Commission and staff have remained focused on ensuring the continued safe operation of U.S. nuclear power plants. This has required the NRC to prioritize the implementation of the Fukushima lessons learned into its existing work so that important safety issues such as implementation of fire protection enhancements and resolution of generic safety issues are not unduly impacted or delayed. Since the issuance of the Commission's direction, the NRC's plans to implement the lessons learned have been considerably enhanced by stakeholder interactions. These enhancements have led to expansions of the original recommendations to include additional capabilities to prevent, mitigate, and respond to extreme external events at U.S. nuclear power plants.

On March 12, 2012, the NRC issued three orders requiring safety enhancements of operating reactors, construction permit holders, and combined license holders. The operating plants are required to promptly begin implementation of the safety enhancements and complete implementation within two refueling outages or by December 31, 2016, whichever comes first. Aside from the orders, the NRC issued a request for information, requesting each reactor licensee to reevaluate the seismic and flooding hazards at their site using present-day methods and information, conduct walkdowns of their facilities to confirm protection against the hazards

in their current design basis, and reevaluate their emergency communications systems and staffing levels. Implementation of each of the recently issued orders and requests for information will require substantial engineering work for each plant.

Completion of the detailed seismic and flooding reevaluations will be resource intensive and time consuming for some licensees due, in part, to their geographical location. To further complicate scheduling, limited national expertise exists (i.e., for the NRC, industry, other external stakeholders) to perform the detailed safety analyses of seismic and flooding hazards, requiring the reevaluations to be sequenced. In the seismic area, these factors may challenge completion within the schedule desired by the Commission. As such, the NRC will prioritize U.S. plants so that those with the highest risk will perform the reevaluations first, leading to most of the plants completing their reevaluations within five years. The Commission will continue to monitor the industry's efforts to ensure that the seismic and flooding reevaluations are completed as expeditiously as possible. Industry representatives have indicated that they may propose a different approach that could allow reevaluations to be completed earlier. If the staff agrees that the approach is acceptable, it may have a positive effect on the overall schedule.

2. *The Task Force and the NRC staff concluded that the post-Fukushima recommendations are needed for the "adequate protection" of public health and safety. That means that these recommendations do not have to undergo a cost-benefit analysis to be implemented. Do you agree with the NRC staff s determination that the recommendations are needed for the "adequate protection" of public health and safety? If not, why not?*

Answer:

The Near-Term Task Force (NTTF) concluded that, similar to the attacks of September 11, 2001, the Fukushima Dai-ichi accident provided new insights regarding low-likelihood, high-consequence events that warranted enhancements to defense-in-depth on the basis of redefining the level of protection that is regarded as adequate. In the SRM for SECY-11-0137, "Prioritization of Recommended Actions to Be Taken in Response to Fukushima Lessons Learned," dated December 15, 2011, the Commission stated:

> In the absence of a fully developed justification for a proposed new requirement, the Commission finds it premature to initiate actions on the Near Term Task Force recommendations under the premise of assuring or redefining the level of protection of public health and safety that should be required as adequate in accordance with the backfit rule. The Commission will evaluate the staff's basis for imposing new requirements when documented in notation vote papers for any new requirements promulgated by orders or rulemaking.

In SECY-12-0025, "Proposed Orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Tsunami," dated February 17, 2012, the staff proposed issuance of three orders requiring safety enhancements of operating reactors, construction permit holders, and combined license holders, all on the basis of redefining the level of protection that is regarded as adequate. These orders require nuclear power plants to implement safety enhancements related to (1) mitigation strategies to respond to extreme natural events resulting in the loss of power at plants, (2) ensuring reliable hardened containment vents, and (3) enhancing spent fuel pool instrumentation.

I supported issuance of two of the three orders on the basis of ensuring adequate protection. I did not find sufficient justification to impose the order on enhancing spent fuel pool instrumentation as a matter of adequate protection. Rather, I recommended exercising an administrative exemption from the requirements of the backfit rule (10 CFR 50.109), as part of the basis for this order.

In my vote supporting issuance of the orders, I explained that the likelihood of a catastrophic event affecting spent fuel pools in the U.S. remains very low and the imposition of the order on mitigation strategies supplements existing protection for spent fuel pool cooling. Furthermore, as the NRC's Advisory Committee on Reactor Safeguards pointed out, the overall contribution to risk from spent fuel pools is low. Thus, I found it difficult to support the order on spent fuel pool instrumentation as necessary for adequate protection. While there are obvious benefits, it would have been difficult to assess them in a quantitative or qualitative manner, particularly in a short time frame. I, along with the majority of my fellow Commissioners, voted that the Commission should take the rare step of exercising an administrative exemption from the backfit rule in support of the issuance of this order. This exemption allowed the Commission to issue the order without performing a cost-benefit analysis.

I will make decisions regarding the bases for imposing any future requirements related to the NTTF recommendations after assessing the NRC staff's recommendation and any justification provided to support the recommendation.

Questions from Senator Tom Carper

1. *You recently decided to grant new reactor licenses for the first time in 30 years to the Vogtle site in Georgia where two new reactors will be built. However, not all of you agreed on what the appropriate approach to addressing the Fukushima recommendations should be. Can each of you share your perspectives on that decision?*

Answer:

I was very pleased that the Commission itself conducted the mandatory hearing for the Vogtle application. I was very impressed by the breadth and the depth of the staff's review. The Commission affirmed its mandatory hearing decision in a public session on February 9, 2012. As I said at that time, the Commission is not ignoring Fukushima, as evidenced by the multiple Commission meetings and decisions, and the huge agency effort to assess and implement lessons learned from the Fukushima Dai-ichi events.

The Commission's approach to the Fukushima recommendations, as it applied to the issuance of the Vogtle COL licenses, is set forth in the Commission's memorandum and order of February 9, 2012. The majority decision, supported by four members of the Commission, included a distinct section on Fukushima Dai-ichi. Pages 81-84 are attached for your information (Attachment 1. It explained the Commission's approach and reflected my views. I note that the Vogtle COLs are now the subject of judicial review.

Thereafter, on February 17, 2012, the staff provided the Commission with proposed orders and a request for information in response to lessons learned from Japan's March 11, 2011, Great Tōhoku Earthquake and Tsunami. While the Commissioners were not unanimous in their views regarding the underlying bases for these proposals, the Commission approved the three recommended orders, two of which were issued to the Vogtle licensee, and also approved the proposed request for information. My approvals rested on the technical and policy judgments that I laid out in considerable detail in my vote of February 29, 2012 (Attachment 2).

Questions from Senator James Inhofe

1. *I understand that the Fukushima units that were operating last March had shut down or were in the process of safely shutting down after the earthquake, and that it wasn't until the tsunami inundated the site that on-site power was lost. There were other recent earthquakes both in Japan (2007) and in the U.S. (2011) where plants shut down as designed following large, historic earthquakes with little or no damage to safety systems or plant structures. Given this operating experience, what is the Commission's view on the robustness of U.S. plants with respect to seismic hazards?*

Answer:

Operating nuclear power plants in the U.S. are designed to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. In addition, the design practices for nuclear power plants result in an additional seismic design margin. This conclusion was confirmed by the results of the program for "Individual Plant Examination of External Events" (IPEEE). In the mid-to-late 1990s NRC staff reviewed the plants' assessments of potential consequences of earthquakes, including those larger than the maximum historical earthquake for the region surrounding each plant, which licensees performed as part of the IPEEE program. As a result of the IPEEE program, additional enhancements were made to some plants. From this review, the NRC staff confirmed that seismic designs of operating plants have additional safety margins to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. The recent earthquake in Mineral, VA, further confirmed this conclusion as the North Anna plant safely shutdown and there was no measurable or significant damage to the plant. In response to the accident at the Fukushima Dai-ichi nuclear power plant caused by the March 11, 2011, Tōhoku earthquake and tsunami, the NRC has issued a request to licensees of operating nuclear power plants to reevaluate likely increases in the seismic hazards for some plants to determine if any regulatory actions may be needed.

2. *The Fukushima-related orders and requests for information issued to power reactor licensees appear to require substantial engineering and analytical resources. Do you believe there are sufficient industry and agency resources, especially in the external hazard areas, such as seismic and flooding, to adequately perform and review the analyses in the timeframe given?*

Answer:

The NRC believes that industry and the agency have adequate resources to perform the associated work for each of the nuclear power plants in the U.S. within the schedules outlined in the subject orders and requests for information. The NRC is currently engaging the Nuclear Energy Institute and other stakeholders on the implementation guidance the NRC is considering related to the current hazards and potential risks posed by flooding and seismic events. The NRC staff will evaluate each licensee's response to the request for information and take

additional regulatory action, as necessary, to facilitate a consistent approach that may help reduce the resources required to carry out all of the re-evaluations.

Industry representatives have also indicated that, due to limited industry expertise to perform probabilistic safety analyses of seismic and flooding hazards, they may propose an approach to assess the impact of the updated seismic and flooding hazards that may be different from the approaches the NRC is envisioning. If the NRC staff agrees with industry's proposal, licensees may be permitted to complete the reevaluations based on a risk prioritization which could ease the substantial engineering and analytical resources needed to perform the analysis.

3. *Has the Commission completed a review of the differences between the regulatory requirements and oversight in Japan versus what we do here in the United States? Can you share with the Committee what you believe to be significant differences and what they might mean with respect to the protection of U.S. plants?*

Answer:

The NRC has not conducted a formal review of the differences between the regulatory and oversight requirements in Japan versus what is done here in the U.S. Consistent with the NRC's mission, the NRC staff will continue to monitor all lessons-learned activities developed by domestic stakeholders and international counterparts to ensure public health and safety. In doing so, the NRC staff has learned from Japanese counterparts that they are looking to implement several actions in the near term to ensure that their nuclear power plants continue to operate safely. Reports indicate that the Japanese are currently looking to re-structure their regulatory body to emulate the NRC/DOE model established by the Energy Reorganization Act of 1974. This change would modify their current regulatory structure and separate the promotion of atomic energy from its regulation. Additionally, the Japanese indicated that they are planning to implement many of the regulations for large area fires and explosions that the NRC implemented after the events of September 11, 2001.

4. *For over six years, the NRC has been considering the license renewal application for the Pilgrim plant. This situation defies the NRC's Efficiency Principle of Good Regulation which states "Regulatory decisions should be made without undue delay." What would you say to Pilgrim's 650 employees who are wondering right now what their intermediate and long term employment prospects at Pilgrim are given the NRC's dismal record, even given that so-called "timely renewal" provisions allow operation after their license expires on June 8th? These people are wondering whether they will be able to provide for their families and pay their mortgages. When will you be able to give them an answer?*

Answer:
I am not participating in the Pilgrim license renewal proceeding.

5. *Orders have been issued implementing post-Fukushima Tier 1 measures. Please describe whether these measures will make quantifiable improvements in the safety of our nuclear plants and how those improvements have been quantified.*

a. If the benefits from the orders cannot be measured, please describe your rationale for imposing these requirements.

Answer:

The benefits from the orders have not been quantified. The Commission approved the issuance of the proposed Orders on March 9, 2012 based on (1) ensuring continued adequate protection under 10 CFR 50.109 (the Backfit Rule), Section (a)(4)(ii) for "Mitigation Strategies for Beyond-Design Basis External Events" and "Reliable Hardened Containment Vents;" and (2) an administrative exemption to the Backfit Rule for "Reliable Spent Fuel Pool Instrumentation."

b. Was a cost-benefit analysis, such as that required by the NRC's backfit rule, utilized for any of the new requirements? If not, why?

Answer:

The NRC's Commission approved the issuance of the proposed Orders on March 9, 2012 based on (1) ensuring continued adequate protection under 10 CFR 50.109(a)(4)(ii) for "Mitigation Strategies for Beyond-Design Basis External Events" and "Reliable Hardened Containment Vents;" and (2) an administrative exemption to the Backfit Rule for "Reliable Spent Fuel Pool Instrumentation." As such, the basis for the NRC's issuance of these Orders did not rely on, or require, a comparison of cost versus expected benefits.

c. How did each of you determine the amount of time that would be necessary for licensees to comply with the new requirements?

Answer.

The NTTF concluded and the staff agreed that continued operation of nuclear power plants does not pose an imminent risk to public health and safety. In SRM for SECY-11-0124, dated October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." The NRC staff remains committed to this goal and has worked diligently with stakeholders to establish reasonable timeframes for licensees to comply with the new Tier 1 requirements.

In evaluating potential implementation schedules, the NRC considered the complexity of the technical and engineering issues involved, other important safety enhancements being implemented by licensees beyond those related to lessons learned from Fukushima, and input from external stakeholders. Ultimately, the NRC established schedules that supported

implementation of the new requirements during routine refueling outages at each nuclear power plant. To support the established schedules, the NRC staff anticipates issuing implementation guidance for the Tier 1 orders by August 31, 2012, and each licensee will be required to achieve full compliance within two refueling cycles after the issuance of the guidance, or by December 31, 2016, whichever comes first.

d. Did you consider whether the cumulative effects of complying with the new requirements could distract licensees from other important safety functions? How were these competing considerations balanced?

Answer:

The NRC staff has considered the cumulative effects of complying with the new requirements and has been focused over the past year on making the necessary enhancements to its regulatory system in a systematic, prioritized, and methodical manner. The NRC has prioritized the implementation of the Fukushima lessons-learned items into its existing work such that important safety issues such as implementation of fire protection enhancements and resolution of generic safety issues are not unduly impacted or delayed. The NRC has also worked diligently with the industry's Fukushima Steering Committee and other stakeholders to establish reasonable timeframes and expectations for licensees to comply with the new Tier 1 requirements.

The staff remains committed to meeting its established goal to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." As the NRC works to achieve this goal, the Commission and staff will remain focused on ensuring that the new requirements do not distract licensees from important safety functions and, consistent with the NRC's mission, will ensure that U.S. nuclear plants continue to operate safely.

6. *Explain the Commission's concern with, and programs in place to monitor, cumulative effects of the broad reach and great number of regulatory initiatives that are not limited to the staff's and industry's post-Fukushima efforts.*

Answer.

The concern with the cumulative effect of regulation (CER) is that it can potentially distract those we regulate from executing other primary duties that ensure safety or security. In SECY-11-0032, "Consideration of the Cumulative Effects of Regulation in the Rulemaking Process," dated March 2, 2011, the staff proposed several rulemaking process enhancements to reduce CER. These enhancements included increased interaction with external stakeholders through the rulemaking process (including a public meeting during the final rule stage to discuss implementation issues), issuing guidance with rules, and requesting stakeholder feedback as part of the rulemaking process so that CER can be addressed. The Commission approved

these enhancements and gave additional direction in the SRM for SECY-11-0032.. The staff is planning to conduct a public meeting in late May 2012 to obtain external stakeholder feedback on the CER effort.

Practical limitations impacted the extent to which CER principles were applied to the post-Fukushima orders and requests for information. Notwithstanding those limitations, the NRC incorporated extensive public interaction into the development of the orders and requests for information. The NRC intends to maintain a high level of public interaction throughout the implementation of the post-Fukushima regulatory actions. To the extent practicable, the NRC will consider these actions when determining the implementation schedules of non-Fukushima related rules. External stakeholders will have the opportunity to make the NRC aware of implementation challenges throughout the rulemaking effort. The NRC is increasing its interaction with stakeholders during the regulatory basis phase of the rule, and each proposed rule *Federal Register* notice will include CER-related questions that seek feedback on implementation challenges. Finally, the NRC will conduct a public meeting focused on the rule's implementation during the final rule stage to ensure the NRC understands the unique implementation challenges that each rule presents and allows a reasonable implementation timeframe.

activities are terminated by the holder or the limited work authorizations are revoked by the NRC. Finally, based on our review of the Staff's consideration of new and significant information, we find that the NEPA review conducted by the NRC Staff for the limited work authorizations has been adequate.

E. Fukushima Dai-ichi

As a general matter, our review of recommended actions associated with lessons learned from the Fukushima Dai-ichi events is ongoing. The agency's Near-Term Report included twelve overarching recommendations for improving the safety of both new and operating nuclear reactors.[358] As previously stated, it also determined that "continued operation and continued licensing activities do not pose an imminent risk to public health and safety."[359] We approved and provided direction on certain near-term actions identified by the Near-Term Task Force to be initiated without delay and shortly thereafter approved the prioritization of all of the recommendations and supported the Staff's proposed actions on the top two tiers of recommendations.[360]

As we stated in CLI-11-5, we have in place well-established regulatory processes by which to impose any new requirements or other enhancements that may be

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[358] *See, e.g.*, Near-Term Report at 69-70.

[359] *Id.* at vii. *See also supra* at 22.

[360] *See* Staff Requirements—SECY-11-0124—Recommended Actions to be Taken Without Delay from the Near-Term Task Force Report (Oct. 18, 2011) (ML112911571) (Staff Requirements—SECY-11-0124). Among other things, we directed that the agency "should strive to complete and implement the lessons learned from the Fukushima accident within five years—by 2016." *Id.* at 1. *See also* Staff Requirements—SECY-11-0137—Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned (Dec. 15, 2011) (ML113490055).

needed.[361] The applicability of any new requirement will be determined when the justification is fully developed and we evaluate the Staff's bases. While these processes are well under way, it takes time to complete the steps necessary to ensure that any new requirements are technically justified and implemented appropriately. All affected nuclear plants will be required to comply with NRC direction resulting from lessons learned from the Fukushima accident, regardless of the timing of issuance of the affected licenses.[362] We therefore expect that the new Vogtle units will comply with all applicable "post-Fukushima" requirements.

Our paramount focus, always, is protecting public health and safety. We therefore agree fully with Chairman Jaczko that our responsibility is to make the best decisions for nuclear safety. The Fukushima events were significant, warranting enhancements in nuclear safety measures and we share the Chairman's commitment to implementing Fukushima-related enhancements and to nuclear safety generally. Nonetheless, we find ourselves in disagreement with the specific approach he offers in his dissent—namely, an across-the-board license condition requiring implementation of "all" Fukushima-related requirements prior to operation of the Vogtle plant. Such a license condition, in our view, cannot now be framed in meaningful terms. The Chairman's license-condition approach also is unnecessary, given the myriad of regulatory tools available to the NRC to implement Fukushima-related requirements as they emerge, including requirements applicable to new plants like Vogtle.

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[361] *See generally Callaway*, CLI-11-5, 74 NRC at __ (slip op. at 24-25).

[362] As the Staff has stated, using our established regulatory processes for implementation of any post-Fukushima requirements on already-issued COLs would be comparable to the process used with operating reactors. *See* Ex. NRC000003, Staff Testimony, at 10.

We are confident that the Commission's approach—using rigorous, well-established processes rather than a loosely-defined license condition—will assure timely implementation of new requirements based on Fukushima lessons learned. As described above, we have already provided direction on certain Near-Term Task Force recommendations,[363] and substantial future actions are imminent. For example, we expect to receive this month the Staff's proposal to issue orders imposing new requirements, and will take action on them shortly thereafter. These orders would apply not only to currently-operating plants, but to COL holders as well.

To date, our Fukushima lessons-learned effort has proved fruitful by virtue of thoughtful Staff analysis, stakeholder input, and continuing Commission attention. Just as we have committed to undertaking a systematic and methodical review of the events at Fukushima, a review that inevitably takes time, so must we be vigilant in following a stable, predictable licensing process. Imposing the license condition suggested by Chairman Jaczko would neither improve this effort nor make a difference in the operational safety of new reactors. Indeed, Chairman Jaczko's approach may unintentionally impact the Staff's disciplined work. The proposed license condition might in the end limit the flexibility necessary to ensure that any new requirements are implemented on carefully-considered schedules.

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[363] The Task Force recommended that design certifications and COL applications under active Staff review address Recommendation 4 (regarding prolonged station blackout mitigation) and Recommendation 7 (regarding spent fuel pool makeup capability and instrumentation) before licensing. Near-Term Report at 71. To the extent that these recommendations are not already addressed in the AP1000 certified design, we expect that any applicable site-specific requirements arising from these recommendations—whether imposed by order or by rule—will be applied to the Vogtle licenses, as necessary, prior to the commencement of plant operations.

Furthermore, because the agency continues to develop the technical basis for Fukushima-related requirements, the proposed license condition would lack sufficient details necessary to impose meaningful requirements.[364] As we see the situation, a general license condition, without specific directives, that says (in effect) that the NRC is committed to applying and enforcing future, but yet-to-be-developed, safety requirements amounts largely to symbolism. Nuclear safety is not advanced by imposing overly-broad, ill-defined requirements.

We therefore see no compelling reason to depart from our existing regulatory processes and, for these reasons, we respectfully decline to impose the license condition suggested in Chairman Jaczko's dissent.

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[364] Such a broad-styled license condition would be unacceptably vague. *See Private Fuel Storage, L.L.C.* (Independent Spent Fuel Storage Installation), CLI-00-13, 52 NRC 23, 34 (2000) ("sufficient details should be provided in the license so that the Staff's review is not subject to meaningful debate.").

NOTATION VOTE

RESPONSE SHEET

TO: Annette Vietti-Cook, Secretary

FROM: Commissioner Apostolakis

SUBJECT: SECY-12-0025 – PROPOSED ORDERS AND REQUESTS FOR INFORMATION IN RESPONSE TO LESSONS LEARNED FROM JAPAN'S MARCH 11, 2011, GREAT TOHOKU EARTHQUAKE AND TSUNAMI

Approved __X__ Disapproved __X__ Abstain _____

Not Participating _____

COMMENTS: Below ___ Attached _X_ None ___

SIGNATURE

February 29, 2012
DATE

Entered on "STARS" Yes _x__ No ___

Attachment 2

Commissioner Apostolakis' Comments on SECY-12-0025
Proposed orders and Requests for Information in Response to Lessons Learned from Japan's March 11, 2011, Great Tohoku Earthquake and Tsunami

I commend the staff for their hard work to implement the Tier 1 activities, including development of the proposed orders and 50.54(f) letter for Commission consideration under extreme time constraints. I also appreciate the leadership that the Steering Committee has provided. The staff's proposal is buttressed by the language of the FY 2012 appropriations law for the NRC and the accompanying conference report language. These directives from Congress reflect an important policy judgment that the Commission must act promptly on the Tier 1 recommendations.

I approve issuance of the proposed orders subject to the following comments. I do not find compelling the staff's justification for redefinition of adequate protection. Instead, I approve issuing the orders for mitigating strategies and containment vents as necessary to ensure continued adequate protection. Furthermore, I approve the proposed order regarding spent fuel pool instrumentation, but I do not find sufficient justification to impose it as a matter of adequate protection. Therefore, I recommend exercising an administrative exemption from the requirements of the backfit rule (10 CFR 50.109), as part of the basis for this order.

The Commission has broad discretion to determine necessary safety measures on a case-by-case basis using engineering judgment and the relevant technical information available at the time. Each of these proposed orders represents a worthwhile safety improvement. Their issuance is justified from a policy perspective in light of particular and unusual circumstances favoring timely action in response to the lessons learned from the accident at Fukushima Dai-ichi. Practically speaking, the requirements imposed by the orders should be the same regardless of whether such proposals are characterized as ensuring adequate protection, redefining adequate protection, or exercising an administrative exemption to the backfit rule.

Adequate protection is not defined by statute or regulation. It does not mean zero risk or absolute protection. The Commission is charged by statute with deciding what measures are necessary to provide reasonable assurance that the public will be protected. In addition, the Commission has broad authority to set such standards as the Commission deems necessary or desirable to enhance safety beyond the minimum requirements for adequate protection.

The Commission has recognized the importance of regulatory stability and has imposed discipline on regulatory decision making through the backfit rule as well as through issue finality provisions in 10 CFR Part 52. Only once has the Commission concluded that it was appropriate to exempt itself administratively from backfitting requirements. This was done when the Commission imposed the aircraft impact assessment rule on new reactors, including already-certified designs, in response to the specific challenges created by the events of September 11, 2001. Similarly, the events at Fukushima Dai-ichi point to a specific set of challenges warranting regulatory action that is not easily accomplished within the existing framework.

As the staff noted in SECY-12-0025, the events at Fukushima Dai-ichi demonstrate that extreme external events may adversely affect: (i) more than one unit at a site with two or more units, and (ii) multiple safety functions at each of several units located on the same site. The staff also noted that the events at Fukushima highlighted the possibility that extreme natural phenomena could challenge the prevention, mitigation, and emergency preparedness defense-in-depth layers

While true, the "possibility" that extreme natural phenomena "could challenge" defense-in-depth layers does not, in itself, provide a compelling justification for action under the mantle of

adequate protection. This thought is not inconsistent with the Near-Term Task Force (NTTF) conclusion that "a sequence of events like the Fukushima accident is unlikely to occur in the United States and some appropriate mitigation measures have been implemented, reducing the likelihood of core damage and radiological releases." Also arguably weighing against the need for immediately effective orders based on adequate protection is the fact these proposals are characterized as providing "enhancements" for protection against beyond-design-basis events that are believed to be of very low probability and for which some mitigation capability is already available beyond the multiple layers of protection for design basis events.

More specific factors may distinguish the circumstances that led to the Fukushima accident. For instance, I refer to the considerable under-estimation of the design basis tsunami for Fukushima Dai-ichi. In addition, the decision-making protocols during emergencies at nuclear facilities in the United States differ significantly from those in Japan. While a full comparison of pertinent regulatory requirements and programs could provide additional relevant information, and may do so in time, the staff reasonably recommends that we initiate appropriate action now.

In addition to its technical findings and recommendations, the NTTF also found that the NRC should clarify its regulations and guidance related to adequate protection and the appropriate balancing of defense in depth and risk information (Recommendation 1). The NRC activities related to NTTF Recommendation 1 are ongoing. Thus, to ensure a timely response to the lessons learned from the Fukushima accident, these orders are being undertaken without realizing the benefit of potential improvements to the NRC's regulatory framework. I acknowledge that an unfortunate consequence of taking action now is that the so-called regulatory "patchwork" is perpetuated. Also, it is normally preferable that the implementation guidance be ready and be subjected to comment by all stakeholders before imposing new requirements.

There are substantive factors that favor acting under continued assurance of adequate protection for the orders on mitigation strategies and containment vents. These proposed requirements are tied to prior regulatory determinations and firm expectations that protection is warranted in these areas. In addition, I find substantive factors that favor exercising an administrative exemption to the backfit rule for issuance of the order on spent fuel pool instrumentation.

Mitigation Strategies

Following the terrorist attacks of September 11, 2001, the Commission established new security requirements via orders on the basis of adequate protection. Those requirements resulted from new insights regarding potential security events. The subsequent rule promulgated to codify the security orders related to development of mitigation strategies for beyond-design-basis events was also issued as a matter of adequate protection. Similarly, regarding the lessons learned from the Fukushima Dai-ichi accident, the staff agreed with the NTTF that the accident provides new insights into extreme events that warrant enhancements to defense in depth on the basis of adequate protection. In addition, results of NRC inspections conducted immediately after the Fukushima Dai-ichi accident indicated some problems with the availability or functionality of such equipment and revealed that the equipment was not always maintained appropriately or systematically at all sites. This order will further ensure adequate protection in that external events will not compromise the functionality or availability of this equipment for each unit at multi-unit sites.

Containment Vents

The 1989 generic letter, which requested that licensees with a Mark I plant provide notification of their plans to address installation of a hardened vent, reflected an expectation that industry would have means for dealing with the Mark I containment issues arising during some severe accidents. Although the NRC did not impose binding requirements regarding hardened vents, it was prepared to do so for any licensee that did not voluntarily make the suggested plant modifications. The accident at Fukushima bolsters the earlier concerns regarding the Mark I containment design and supports action to ensure that functionality is maintained under extreme conditions. As the staff pointed out, because Mark II containment designs are only slightly larger in volume than Mark I containment designs and use wetwell pressure suppression, it can reasonably be concluded that a Mark II under similar circumstances would have suffered similar consequences. Therefore, it is appropriate to impose the order on both BWR Mark I and II licensees as a matter of ensuring continued adequate protection.

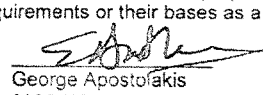
Spent Fuel Instrumentation

As I stated, I support the proposed order regarding spent fuel pool instrumentation, but I do not find sufficient justification at this time to impose it as a matter of adequate protection. Although there may be several benefits to enhanced spent fuel pool instrumentation, the most compelling reason is, as the staff states, the recognition that Fukushima demonstrated the confusion and misapplication of resources that can result from extreme beyond-design-basis external events when more diverse instrumentation is not available. On the other hand, the likelihood of a catastrophic event affecting spent fuel pools in the U.S. remains very low and the imposition of the order on mitigation strategies supplements existing protection for spent fuel pool cooling. Furthermore, as the ACRS pointed out, the overall contribution to risk from spent fuel pools is low. Thus, I find it difficult to support this immediately effective order as necessary for adequate protection. While there are obvious benefits, it would be difficult to assess them in a quantitative or qualitative manner, particularly in a short time frame. Therefore, the Commission should take the rare step of exercising an administrative exemption from the backfit rule in support of the issuance of this order.

Conclusion

Overall, I find that these three orders contain sound and common-sense proposals. They could rest on one or more regulatory bases. At the very least, they enhance protection of public health and safety in mitigating the consequences of beyond-design-basis external events. Moreover, the staff has had extensive interaction with stakeholders as the development of these proposals has proceeded. I am unaware of any significant comment that these proposed actions are not warranted.

My vote reflects my conclusion that unusual and particular circumstances favor issuance of the proposed orders for mitigating strategies and containment vents as needed for ensuring continued adequate protection, as well as the order on spent fuel pool instrumentation as enhanced protection under an administrative exemption to the backfit rule. These are specific case-by-case determinations. Even though these orders are to be made immediately effective, they are premised on the need for prompt action to complete the necessary analysis and ensure timely implementation of these safety improvements. Eventually, some of these proposals will lead to rulemaking with appropriate adjustments in the requirements or their bases as a result of further study.



George Apostolakis
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Senator BOXER. Thank you very much.
And Hon. William Magwood.

STATEMENT OF HON. WILLIAM D. MAGWOOD, IV, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Mr. MAGWOOD. Thank you, Chairman.

Chairman Boxer, Chairman Carper, Ranking Member Barrasso, members of the Committee and Subcommittee, it is a pleasure to be here before you today to talk about our work regarding the Fukushima disaster.

First, let me say: U.S. plants are safe. We are quite confident about that. But as we reported during our last appearance before this Committee, our agency has moved swiftly and systematically to understand the events in Japan and to design a prudent, effective regulatory response to address the lessons of Fukushima. This matter has been our central focus over the last year. The Commission has devoted a large portion of its time and energy to this challenge.

The Chairman has already outlined the details of our response, so I won't repeat that now. But let me say that while we have moved quickly, I am very confident the decisions we have made to date are appropriate and when fully implemented will address the large portion of any risk that we revealed by our insights gained from studying the Fukushima event.

This week, we met with many of our international colleagues at the 24th Regulatory Information Conference. From my conversations with our colleagues it is clear that many of the world's regulators have viewed these issues in much the same way. I expect that the response to Fukushima across the world will have considerable similarity in many countries.

I want to point out the NRC staff has performed in an outstanding fashion in pursuit of this outcome. They have worked tirelessly to review these complex issues in a holistic fashion, working with our many stakeholders and consulting with the Advisory Committee on Reactor Safeguards. I would like to recognize the valuable contributions provided by Marty Virgilio, who served as chairman of the steering committee that leads this overall effort in the agency. Marty recently announced that he will soon retire after 34 years with the agency, and his leadership will be sorely missed.

Finally, I want to conclude by extending my thoughts and encouragement to the citizens of Japan as they continue to recover from last year's earthquake and tsunami. Commissioner Ostendorff and I visited the Fukushima site in January and saw first-hand how hard our friends in Japan are working to deal with the aftermath of what they now call 3/11. That term has a deep, enduring resonance that Americans understand quite well. I wish our Japanese colleagues the very best success in their efforts.

Thank you for your attention. I look forward to your questions.

[The responses of Mr. Magwood to questions for the record follow:]

Questions from Senator Boxer

Question 1. **The Commission provided direction to the NRC staff to strive to complete all recommendations by 2016. However, the NRC's recent orders provide plant operators with more than five years to complete important seismic re-evaluations. What steps can the Commission take to ensure that the NRC completes these recommendations by 2016?**

ANSWER

I believe the staff's approach to complete the work approved thus far by 2016 has been reasonable and responsible. This date is a good target that has provided considerable discipline to our efforts and assured that important safety activities are carried out expeditiously. That said, I believe that it is most important to address areas of highest risk as soon as possible and I would not support an approach that delayed the re-evaluation of plants in high-seismic-risk areas in order to complete re-evaluations of plants in very low risk areas simply to meet the target. It is vital to prioritize this effort, particularly because there are a limited number of experts available to the NRC, to industry, and to all other stakeholders to perform the detailed safety analyses of seismic and flooding hazards. As staff proceeds to develop a clear understanding of the hazards faced by each plant and the resources and expertise necessary to complete each evaluation, the Commission will be in a stronger position to set a path to complete all re-evaluations as soon as practicable.

Question 2. **The Task Force and the NRC staff concluded that the post-Fukushima recommendations are needed for the "adequate protection" of public health and safety. That means that these recommendations do not have to undergo a cost-benefit analysis to be implemented. Do you agree with the NRC staff's determination that the recommendations are needed for the "adequate protection" of public health and safety?**

ANSWER

As I stated in my vote on the staff's recommendations, I agreed with the staff that the "Order Modifying Licenses with Regard to Reliable Hardened Containment Vents" is necessary for adequate protection of public health and safety. The importance of the reliable operation of such vents during emergency conditions has been known in the U.S. for two decades, and this understanding has been reinforced by the clear lessons of Fukushima. The order ensures that reliable operation of the vents is consistent across all plants subject to the order.

However, with respect to the two remaining orders, those related to mitigating strategies and spent fuel pool instrumentation; I did not believe that the staff had provided the necessary analysis to support issuing the proposed orders as necessary for adequate protection. However, as I noted at the time, I believe that both orders represent prudent, beneficial responses to the lessons learned from the events at Fukushima and therefore approved their issuance pursuant to an "administrative exemption" from the NRC's backfit requirement. The majority of the Commission agreed that the spent fuel pool instrumentation order should be issued pursuant to an administrative exemption. The fact that this order was issued under an administrative exemption did not alter the substance of the requirements in the order. Moreover, compliance with the order is mandatory for all licensees to whom it has been issued.

Question from Senator Carper

Question 1. **You recently decided to grant new reactor licenses for the first time in 30 years to the Vogtle site in Georgia where two new reactors will be built. However, not all of you agreed on what the appropriate approach to addressing the Fukushima recommendations should be. Can each of you share your perspectives on that decision?**

ANSWER

The Vogtle decision was an adjudicatory matter; Commission deliberations related to adjudicatory matters are generally not publicly disclosed. Therefore, I am not in a position to provide additional detail regarding the Commission's decision with respect to the Vogtle licensing decision. However, as the majority of the Commission stated in that decision (CLI-12-2), the NRC has "in place well-established regulatory processes by which to impose any new requirements or other enhancements that may be needed." At the time we issued the decision, the majority of the Commission stated that we would determine the applicability of any new post-Fukushima requirements as the staff's justification for each requirement was developed and based upon our evaluation of that justification. At the time CLI-12-2 was issued, I fully supported the majority decision and continue to do so.

Since the Vogtle decision was issued, the staff's proposed orders with respect to mitigation strategies and spent fuel pool instrumentation have been approved by the Commission and issued to the licensee. Similarly, when the Summer license was issued, it contained a license condition related to the mitigation strategies order, and the spent fuel pool instrumentation order was issued to Summer shortly after its license was issued. I expect that future post-Fukushima requirements for Vogtle, Summer, and any subsequent combined operating licenses issued also will be able to be addressed through the agency's normal processes.

At bottom, I believe that the approaches in the decision and the dissent each achieve the same safety goals. The path selected by the majority of the Commission provides for a more stable and predictable licensing process that will minimize the need to adjust the Vogtle license as the NRC refines its response to Fukushima.

Questions from Senator Inhofe

Question 1. **I understand that the Fukushima units that were operating last March had shut down or were in the process of safely shutting down after the earthquake, and that it wasn't until the tsunami inundated the site that on-site power was lost. There were other recent earthquakes both in Japan (2007) and in the U.S. (2011) where plants shut down as designed following large, historic earthquakes with little or no damage to safety systems or plant structures. Given this operating experience, what is the Commission's view on the robustness of U.S. plants with respect to seismic hazards?**

ANSWER

Operating nuclear power plants in the United States are designed to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. In addition, the design practices for nuclear power plants result in an additional seismic design margin. This conclusion was confirmed by the results of the program for "Individual Plant Examination of External Events" (IPEEE). In the mid-to-late 1990s NRC staff reviewed the plants' assessments of potential consequences of earthquakes, including those larger than the maximum historical earthquake for the region surrounding each plant, which licensees performed as part of the IPEEE program. As a result of the IPEEE program, additional enhancements were made to some plants. From this review, the NRC staff confirmed that seismic designs of operating plants have additional safety margins to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. The recent earthquake in Mineral, VA, further confirmed this conclusion as the North Anna plant safely shutdown and there was no measurable or significant damage to the plant. In response to the accident at the Fukushima Dai-ichi nuclear power plant caused by the March 11, 2011 Tohoku

earthquake and tsunami, the NRC has issued a request to licensees of operating nuclear power plants to reevaluate likely increases in the seismic hazards for some plants to determine if any regulatory actions may be needed.

Question 2. **The Fukushima-related orders and requests for information issued to power reactor licensees appear to require substantial engineering and analytical resources. Do you believe there are sufficient industry and agency resources, especially in the external hazard areas, such as seismic and flooding, to adequately perform and review the analyses in the timeframe given?**

ANSWER

The NRC believes that industry and the agency have adequate resources to perform the associated work for each of the nuclear power plants in the U.S. within the schedule outlined above. The NRC is currently engaging the industry and other stakeholders on the implementation guidance the NRC is considering related to the current hazards and potential risks posed by flooding and seismic events. The NRC staff will evaluate each licensee's response to the request for information and take additional regulatory action, as necessary, to facilitate a consistent approach that may help reduce the resources required to carry out all of the re-evaluations.

In recent meetings with NRC staff, industry representatives have also indicated that, due to limited industry expertise to perform probabilistic safety analyses of seismic and flooding hazards, the utility industry may propose a new, risk-based approach to assess the impact of the updated seismic and flooding hazards.

If the NRC agrees with industry's proposal, licensees may be permitted to complete the re-evaluations based on a risk prioritization which could alleviate concerns associated with the substantial engineering and analytical resources needed to perform the analysis.

Question 3. **Has the Commission completed a review of the differences between the regulatory requirements and oversight in Japan versus what we do here in the United States? Can you share with the Committee what you believe to be significant differences and what they might mean with respect to the protection of U.S. plants?**

ANSWER

The NRC has not conducted a formal review of the differences between the regulatory and oversight requirements in Japan versus what is done here in the U.S. The staff continues to monitor the daily events at Fukushima Dai-ichi in order to affirm that current regulatory requirements and existing plant capabilities allow for the determination that a sequence of events like the Fukushima Dai-ichi accident is unlikely to occur in the U.S. Consistent with the NRC's mission, the NRC staff will continue to monitor all lessons-learned activities developed by domestic stakeholders and international counterparts to ensure public health and safety. In doing so, the NRC staff has learned from Japanese counterparts that they are looking to implement several actions in the near-term to ensure that their nuclear power plants continue to operate safely. Reports indicate that the Japanese government is developing an approach to restructure Japan's regulatory organization along lines that are similar to the structure used in the United States. Japanese plants are also expecting to implement measures much like those put into place at U.S. reactors after the terrorist attacks of September 11, 2001. Fundamentally, these measures consist of portable pumps and portable electrical power supplies. Although they were designed to mitigate the consequences of a potential crash of a large aircraft into the reactor complex, these measures could potentially mitigate the effects of other beyond design

basis events. Had these measures been in place at Fukushima Dai-ichi, additional equipment and strategies may have been available to help mitigate the effects of the earthquake and tsunami.

Question 4. **For over six years, the NRC has been considering the license renewal application for the Pilgrim plant. This situation defies the NRC's Efficiency Principle of Good Regulation which states "Regulatory decisions should be made without undue delay." What would you say to Pilgrim's 650 employees who are wondering right now what their intermediate and long-term employment prospects at Pilgrim are given the NRC's dismal record, even given that so-called "timely renewal" provisions allow operation after their license expires on June 8th? These people are wondering whether they will be able to provide for their families and pay their mortgages. When will you be able to give them an answer?**

ANSWER

As a general matter, I believe that licensing activities should take whatever time is needed to bring them to a responsible conclusion. However, this does not mean that any such process should be permitted to drag on interminably. Such a circumstance is not only unfair to applicants, but also to local communities that deserve the certainty that accompanies a timely regulatory decision process.

For this reason, the NRC staff has set a goal of completing its regulatory review of uncontested license renewal requests and issuing its final decision on the application within 30 months from the receipt of the application. The NRC staff initially completed its safety review of the Pilgrim license renewal application in June 2007 and its environmental review in July 2007. However,

we are mindful of our responsibilities under the Atomic Energy Act, the Administrative Procedure Act, and the Commission's rules to ensure a fair opportunity for public participation in that process. Where an individual or entity establishes that it has standing to request a hearing, (*i.e.*, the person shows that its interests could be adversely affected) and includes at least one admissible contention (a specific issue of law or fact, supported by fact or expert opinion, and material to the NRC's licensing decision), NRC regulations afford that person an opportunity for a hearing on the license renewal application. However, the admission of contentions challenging the license renewal often pushes the agency's decision past 30 months.

In the case of the Pilgrim license renewal, this request was the subject of extensive challenges from members of the public. The issues raised in the proceeding included a number of highly complex, and novel, technical issues of first impression for the Licensing Boards and the Commission, as well as novel legal questions. The record in this case reflects that the Licensing Boards and the Commission have undertaken significant effort to resolve many issues in a timely and thorough way, taking the time needed to thoughtfully and fairly address complicated issues.

Consistent with the NRC's regulations and the Administrative Procedure Act, and the timely renewal provisions, the pendency of a hearing does not affect the licensee's ability to continue to operate the facility. The NRC has developed a comprehensive regulatory process and procedures for evaluating nuclear power reactor license renewal applications to ensure the continued protection of public health and safety if a renewed nuclear reactor operating license is issued. Employment decisions by a licensee are a function of the licensee whether those decisions occur during its current operations or during a period of extended operations under timely renewal.

Question 5. **Orders have been issued implementing post-Fukushima Tier 1 measures. Please describe whether these measures will make quantifiable improvements in the safety of our nuclear plants and how those improvements have been quantified.**

ANSWER

A cost-benefit analysis was not prepared for any of the three post-Fukushima orders issued on March 9, 2012. These three orders were each issued under an exception to the agency's Backfit Rule, which would generally require such an analysis.

a) **If the benefits from the orders cannot be measured, please describe your rationale for imposing these requirements.**

The benefits from the Orders are not measured in terms of strict financial costs and benefits because the agency has judged them to be necessary to provide "a reasonable assurance of adequate protection to the public." The NRC continues to affirm that continued operation and continued licensing activities provide a reasonable assurance of adequate protection to the public. However, the NRC's assessment of new insights from the events at Fukushima Dai-ichi led the staff to conclude that additional requirements should be imposed on licensees to increase the capability of nuclear power plants to withstand natural events beyond what they were designed to endure. As such, the Commission approved the NRC staff's implementation plan for the eight Tier 1 activities outlined in SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11272A111). These Tier 1 items are being implemented by the NRC staff without unnecessary delay.

The items include three Orders:

(1) Mitigation Strategies Order – This Order was modeled on Near-Term Task Force (NTTF) Recommendation 4.2, but was substantially enhanced in response to stakeholder feedback. It was issued to all reactor licensees, including holders of construction permits under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and a holder of a combined license (COL) under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." These licensees are required to develop strategies to withstand natural events beyond what plants were designed to endure, addressing multi-unit events and providing reasonable protection of equipment identified under such strategies.

(2) Reliable Hardened Containment Vents Order – This Order was modeled on NTTF Recommendation 5.1, but was enhanced by stakeholder feedback. It was issued to all reactor licensees operating boiling water reactors (BWRs) with Mark I and Mark II containments. These licensees are required to have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following natural events beyond what plants were designed to endure that result in the loss of active containment heat removal capability or prolonged station blackout.

(3) Spent Fuel Pool Instrumentation Order – This Order was modeled on NTTF Recommendation 7.1, but was enhanced by stakeholder feedback. It was issued to all reactor licensees, including holders of construction permits under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and holders of COLs under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." These licensees are required to have a reliable indication of the water level in associated

spent fuel storage pools capable of supporting identification of pool water level conditions by trained personnel.

The Commission approved the issuance of the proposed Orders on March 9, 2012 based on (1) ensuring continued adequate protection under 10 C.F.R. § 50.109(a)(4)(ii) for "Mitigation Strategies for Beyond-Design Basis External Events" and "Reliable Hardened Containment Vents (Mark 1 and II BWRs);" and (2) an administrative exemption to the Backfit Rule under 10 C.F.R § 52.63 for "Reliable Spent Fuel Pool Instrumentation."

In my individual vote on these orders, I agreed with the staff that the order requiring reliable hardened vents for Mark I and Mark II boiling water reactors was necessary to ensure adequate protection of public health and safety. I found that there is a lengthy history of analysis regarding the need for such vents and our observations of the Fukushima accident only reinforced the need to assure the ability to vent these small containments and avoid a catastrophic loss of containment.

With respect to the spent fuel pool instrumentation order, I found it reasonable that all nuclear power plants operating in the United States should have a reliable means of remotely monitoring a wide range of spent fuel pool levels to support effective prioritization of event mitigation and recovery actions in the event of an extreme beyond-design-basis external event.

Furthermore, the events at Fukushima illustrated the confusion and misapplication of resources that can result from extreme beyond-design-basis external events when more diverse instrumentation is not available. While the likelihood of a similar catastrophic spent fuel pool event in the United States is too low to support issuance of the order based on adequate protection, and there had been no cost-benefit analysis, I believed that, given the obvious benefits of this order, it should be issued.

However, I disagreed with the staff that the orders related to mitigation measures and spent fuel pool instrumentation were necessary for public health and safety. As I explained in my vote on SECY-12-0025 (the staff paper recommending issuance of the orders), I believe that a full regulatory analysis would eventually support the implementation of staff's proposed changes on either an adequate protection or cost-benefit basis and would have preferred that staff conduct such an analysis in the context of Task Force Recommendation 1, which suggests a consideration of our overall regulatory framework.

With respect to the mitigation measures order, I found the specific actions recommended in the order to be prudent responses to the lessons of Fukushima. The experience derived from this incident requires a regulatory response in much the same way the experience of the September 11 terrorist attacks required a response. Nevertheless, the mitigating measures include a complex aggregation of actions and, while I supported their rapid implementation, I also believe that we would benefit from a more rigorous regulatory analysis of the recommended actions. For that reason, I approved issuing the orders related to mitigation measures and spent fuel instrumentation pursuant to an administrative exemption from the Backfit Rule, which would have preserved the ability for eventual staff analysis in the context of Near-Term Task Force recommendation 1.

b) **Was a cost-benefit analysis, such as that required by the NRC's backfit rule, utilized for any of the new requirements? If not, why not?**

As discussed above, each of the three orders was issued under an appropriate exemption to the Backfit Rule. Therefore, no cost-benefit analysis was completed or required at this time.

c) **How did each of you determine the amount of time that would be necessary for licensees to comply with new requirements?**

The Near-Term Task Force concluded and the staff agreed that continued operation of nuclear power plants does not pose an imminent risk to public health and safety. In SRM-SECY-11-0124, dated October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." The NRC staff remains committed to this goal and has worked diligently with stakeholders to establish reasonable timeframes for licensees to comply with the new Tier 1 requirements.

In evaluating potential implementation schedules, the NRC considered the complexity of the technical and engineering issues involved, other important safety enhancements being implemented by licensees beyond those related to lessons learned from Fukushima, and input from external stakeholders. Ultimately, the NRC established schedules that supported implementation of the new requirements during routine refueling outages at each nuclear power plant. To support the established schedules, the NRC staff anticipates issuing implementation guidance for the Tier 1 Orders by August 31, 2012, and each licensee will be required to achieve full compliance within

two refueling cycles after the issuance of the guidance, or by December 31, 2016, whichever comes first.

d) **Did you consider whether the cumulative effects of complying with the new requirements could distract licensees from other important safety functions? How were these competing considerations balanced?**

The Commission has continuously sought to balance staff and licensee resources devoted to the Fukushima response with staff and licensee resources devoted to ongoing safe operation of licensed facilities. To this end, the staff has been focused over the past year on making the necessary enhancements (i.e., regulatory requirements and existing plant capabilities) in a systematic, prioritized, and methodical manner. The decision to sort the Task Force recommendations into Tiers 1, 2, and 3 was to ensure that post-Fukushima actions were afforded the appropriate priority without taking staff and licensee attention away from ongoing safety requirements. Further, the NRC has sought continuous feedback from the industry and other external stakeholders as we have developed our post-Fukushima priorities to establish reasonable timeframes and expectations for licensees to comply with the new Tier 1 requirements and to ensure that no other ongoing safety issues are overlooked.

Minimizing the unintended consequences of balancing multiple regulatory requirements is a particular concern of mine. I will continue to vigorously monitor both our post-Fukushima response and ongoing safety requirements to ensure that appropriate attention is paid to all high-priority items.

Question 6. **Explain the Commission's concern with, and programs in place to monitor, cumulative effects of the broad reach and great number of regulatory initiatives that are not limited to the staff's and industry's post-Fukushima efforts.**

ANSWER

The concern with the cumulative effect of regulation (CER) is that it can potentially distract those we regulate from executing other primary duties that ensure safety or security. In SECY-11-0032, "Consideration of the Cumulative Effects of Regulation in the Rulemaking Process," dated March 2, 2011 (ADAMS Accession No. ML110190027), the staff proposed several rulemaking process enhancements to reduce CER. These enhancements included increased interaction with external stakeholders through the rulemaking process (including a public meeting during the final rule stage to discuss implementation issues), issuing guidance with rules, and requesting stakeholder feedback as part of the rulemaking process so that CER can be addressed. The Commission approved these enhancements and gave additional direction in its associated staff requirements memorandum. The staff is planning to conduct a public meeting in late May 2012 to obtain external stakeholder feedback on the CER direction/effort.

Practical limitations impacted the extent to which CER principles were applied to the post-Fukushima orders and requests for information. Notwithstanding those limitations, the NRC incorporated extensive public interaction into the development of the orders and requests for information. The NRC intends to maintain a high level of public interaction throughout the implementation of the post-Fukushima regulatory actions. To the extent practicable, the NRC will consider these actions when determining the implementation schedules of non-Fukushima related rules. External stakeholders will have the opportunity to make the NRC aware of implementation challenges throughout the rulemaking effort. The NRC is increasing its interaction with stakeholders during the regulatory basis phase of the rule, and each proposed

rule *Federal Register* notice will include CER-related questions that seek feedback on implementation challenges. Finally, the NRC will conduct a public meeting focused on the rule's implementation during the final rule stage to ensure the NRC understands the unique implementation challenges that each rule presents and allows a reasonable implementation timeframe.

As I stated above, minimizing the unintended consequences of balancing multiple regulatory requirements is a particular concern of mine. This issue has impacts beyond our post-Fukushima efforts. With a number of ongoing high-priority licensing, rulemaking, and other regulatory actions, including long-standing items such as fire protection and GSI-191, I believe it is vitally important to continuously monitor the progress of high-priority projects and to adjust resources if necessary. In addition to the agency-wide efforts, in my periodic meetings with senior NRC managers we often discuss the progress of long-term projects and whether additional staff resources need to be applied. In addition, during my meetings with industry representatives and other external stakeholders, I always seek out whether they believe any new regulatory requirements are having an impact on overall safety operations.

Senator BOXER. Thank you, Commissioner.
Commissioner Ostendorff.

STATEMENT OF HON. WILLIAM C. OSTENDORFF, COMMISSIONER, U.S. NUCLEAR REGULATORY COMMISSION

Mr. OSTENDORFF. Thank you, Madam Chairman, Chairman Carper, Ranking Member Barrasso, members of the Committee.

It was just over 1 year since an earthquake and tsunami devastated Japan and led to a severe accident at the Fukushima Daiichi. Last July the Fukushima Task Force of the NRC concluded that a sequence of events in the United States similar to that experienced in Japan is unlikely. The Task Force also concluded there is no imminent risk from continued operation of U.S. nuclear power plants. I believe those conclusions remain true today. Nevertheless, I continue to support the NRC's actions to make our plants even safer.

The NRC has taken positive, concrete steps to strengthen the NRC's regulatory framework in response to Fukushima. I join my colleagues here at this table in also commending the men and women of the NRC for their hard work. I have also appreciated a chance to engage with my four colleagues to my right.

Since I last appeared before this Committee in December I voted to approve the three orders that were submitted to the Commission in February. As mentioned by others, those orders were issued earlier this week. I think it is important for this Committee to know that while we may have had slightly different variations on the bases for these orders that all five of us in a unanimous act approved all three orders. I think that is a significant statement.

Senator BOXER. It is.

Mr. OSTENDORFF. To me these three orders represent sound policy decisions for nuclear safety. And as Commissioner Magwood mentioned, I think we saw in our visit to Fukushima the importance of us taking strong, decisive action as a regulator.

I am confident of the path the NRC is on today. I think we are taking responsible actions. I appreciate the chance to appear before this Committee, and I look forward to your questions.

[The responses of Mr. Ostendorff to questions for the record follow:]

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Follow-Up Questions for Written Submission

Questions for Commissioner Ostendorff
Senator Barbara Boxer

1. The Commission provided direction to the NRC staff to strive to complete all recommendations by 2016. However, the NRC's recent orders provide plant operators with more than five years to complete important seismic re-evaluations. What steps can the Commission take to ensure that the NRC completes these recommendations by 2016?

Answer

In SRM-SECY-11-0124, dated October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." The NRC remains committed to this goal. As the NRC works to achieve this goal, the Commission and staff have remained focused on ensuring the continued safe operation of U.S. nuclear power plants. This has required the NRC to prioritize the implementation of the Fukushima lessons learned into its existing work such that important safety issues such as implementation of fire protection enhancements and resolution of generic safety issues are not unduly impacted or delayed. Since the issuance of the Commission's direction, the NRC's plans to implement the lessons learned have been considerably enhanced by stakeholder interactions. These enhancements have led to expansions of the original recommendations to include additional capabilities to prevent, mitigate, and respond to a similar event at a U.S. nuclear power plant.

On March 12, 2012, the NRC issued the first regulatory requirements for the nation's 104 operating reactors based on the lessons-learned at Fukushima Daiichi. The NRC issued three orders requiring safety enhancements of operating reactors, construction permit holders, and combined license holders. These orders require nuclear power plants to implement safety enhancements related to (1) mitigation strategies to respond to extreme natural events resulting in the loss of power at plants, (2) ensuring reliable hardened containment vents, and (3) enhancing spent fuel pool instrumentation. The plants are required to promptly begin implementation of the safety enhancements and complete implementation within two refueling outages or by December 31, 2016, whichever comes first. In addition, the NRC issued a request for information, requesting each reactor licensee to reevaluate the seismic and flooding hazards at their site using present-day methods and information, conduct walkdowns of their facilities to ensure protection against the hazards in their current design basis, and reevaluate their emergency communications systems and staffing levels. Implementation of the recently issued orders and requests for information will require substantial engineering work for each plant.

The staff's expected schedule for completion of virtually all of the Tier 1 Near-Term Task Force recommendations, those that the Commission and staff identified should be undertaken without delay, are within the 5-year goal. For example, all plants will complete implementation of the safety enhancements required by the orders within 5 years, with some being complete by as early as the fall of 2014. Additionally, the seismic and flooding walkdowns will be completed within approximately one year. The only Tier 1 item that may exceed the 5-year goal is the seismic reevaluation.

Completion of the detailed seismic and flooding reevaluations may be resource intensive and time consuming for some licensees due, in part, to their geographical location. To further

complicate scheduling, limited national expertise exists (i.e., for the NRC, industry, other external stakeholders) to perform the detailed safety analyses of seismic and flooding hazards, requiring the re-evaluations to be sequenced. In the seismic area, these factors may challenge the completion within the schedules desired by the Commission. As such, the NRC will prioritize U.S. plants so that those with the highest risk will perform the reevaluations first, leading to most of those plants completing their reevaluations within five years. The majority of plants, including those with the greatest potential seismic risk, will complete the reevaluations within 5 years. Due to their ongoing seismic hazard studies, the staff anticipates San Onofre and Diablo Canyon will complete their reevaluations within 5 years. Due to limited national expertise and the resultant need to prioritize the reevaluations, a handful of the plants, mainly those with lower seismic risk, may require more than 5 years to complete the detailed reevaluations.

The Commission will continue to monitor the industry's efforts to ensure that the seismic and flooding reevaluations are completed as expeditiously as possible. Industry representatives have indicated that they may propose a different approach that could allow reevaluations to be completed earlier. If the staff agrees that the approach is acceptable and will provide sufficient information to identify appropriate safety enhancements, this may have a positive effect on the overall schedule for some plants.

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Questions for Commissioner Ostendorff
Senator Barbara Boxer

2. The Task Force and the NRC staff concluded that the post-Fukushima recommendations are needed for the "adequate protection" of public health and safety. That means that these recommendations do not have to undergo a cost-benefit analysis to be implemented. Do you agree with the NRC staff's determination that the recommendations are needed for the "adequate protection" of public health and safety? If not, why not?

Answer

Recently, I voted to approve the issuance of three orders for additional requirements based on the lessons learned from Fukushima. My decision on those three orders was based on a case-by-case review of each matter. I judged that two of the orders—one related to accident mitigation strategies and another related to containment vent systems—were necessary to ensure adequate protection.

I judged the third order on spent fuel pool instrumentation to be necessary, but not for reasons of adequate protection. Although the staff proposed issuance of the order based upon the "defining or redefining" adequate protection exception to the Backfit Rule, I was not, however, persuaded that these new requirements rose to the level of adequate protection. While I agree that reliable and available instrumentation is important for plant personnel to effectively prioritize emergency actions, I do not believe that the operating experience from Fukushima showed that the absence of spent fuel pool instrumentation resulted in radiological consequences.

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Follow-Up Questions for Written Submission

Questions for Commissioner Ostendorff
Senator Thomas R. Carper

1. You recently decided to grant new reactor licenses for the first time in 30 years to the Vogtle site in Georgia where two new reactors will be built. However, not all of you agreed on what the appropriate approach to addressing the Fukushima recommendations should be. Can each of you share your perspectives on that decision?

Answer

In approving issuance of the Vogtle combined licenses (COL) and limited work authorizations, I did not see a compelling reason to depart from our existing regulatory processes by imposing an across-the-board, broad license condition requiring implementation of "all" Fukushima-related requirements prior to operation of the Vogtle plant. We have in place well-established regulatory processes by which to impose any new requirements or other enhancements that may be needed. I am confident in the Commission's ability to evaluate and determine the applicability of any new requirement once the staff develops the bases and justification. This approach—using rigorous, well-established processes rather than a loosely-defined license condition—will assure timely implementation of new requirements based on Fukushima lessons learned. In fact, this was the approach that a majority of the Commission approved in our decision for the Summer mandatory hearing. Specifically, we directed the NRC staff to include in the Summer COLs a license condition relative to the development of strategies to address beyond-design-basis external events. We also directed concurrent issuance of a request for information relative to Near-Term Task Force Recommendation 9.3 and Order EA-12-051, related to the enhancement of reliable spent fuel pool instrumentation.

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Questions for Commissioner Ostendorff
Senator James M. Inhofe

1. I understand that the Fukushima units that were operating last March had shut down or were in the process of safely shutting down after the earthquake, and that it wasn't until the tsunami inundated the site that on-site power was lost. There were other recent earthquakes both in Japan (2007) and in the U.S. (2011) where plants shut down as designed following large, historic earthquakes with little or no damage to safety systems or plant structures. Given this operating experience, what is the Commission's view on the robustness of U.S. plants with respect to seismic hazards?

Answer

Operating nuclear power plants in the United States are designed to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. In addition, the design practices for nuclear power plants result in an additional seismic design margin. This conclusion was confirmed by the results of the program for "Individual Plant Examination of External Events" (IPEEE). In the mid-to-late 1990s NRC staff reviewed the plants' assessments of potential consequences of earthquakes, including those larger than the maximum historical earthquake for the region surrounding each plant, which licensees performed as part of the IPEEE program. As a result of the IPEEE program, additional enhancements were made to some plants. From this review, the NRC staff confirmed that seismic designs of operating plants have additional safety margins to withstand earthquakes larger than the maximum historical earthquake for the region surrounding each plant. The recent earthquake in Mineral, Virginia, further confirmed this conclusion as the North Anna plant safely shutdown and there was no measurable or significant damage to plant. In response to the accident at the Fukushima Dai-ichi nuclear power plant caused by the March 11, 2011, Great Tōhoku Earthquake and tsunami, the NRC has issued a request to licensees of operating nuclear power plants to reevaluate likely increases in the seismic hazards for some plants to determine if any regulatory actions may be needed.

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Questions for Commissioner Ostendorff
Senator James M. Inhofe

2. The Fukushima-related orders and requests for information issued to power reactor licensees appear to require substantial engineering and analytical resources. Do you believe there are sufficient industry and agency resources, especially in the external hazard areas, such as seismic and flooding, to adequately perform and review the analyses in the timeframe given?

Answer

The NRC believes that industry and the agency have adequate resources to perform the associated work for the majority of plants, including those with the greatest potential seismic risk, within 5 years. A handful of the plants, mainly those with lower seismic risk, may require more than 5 years to complete the detailed seismic reevaluations. The NRC is currently engaging the Nuclear Energy Institute and other stakeholders on the implementation guidance the NRC is considering related to the current hazards and potential risks posed by flooding and seismic events. The NRC staff will evaluate each licensee's response to the request for information and take additional regulatory action, as necessary, to facilitate a consistent approach that may help reduce the resources required to carry out all of the re-evaluations.

Industry representatives have also indicated that, due to limited industry expertise to perform probabilistic safety analyses of seismic and flooding hazards, they may propose an approach to assess the impact of the updated seismic and flooding hazards that may be different from the approaches the NRC is envisioning. If the NRC staff agrees with industry's proposal, licensees may be permitted to complete the re-evaluations based on a risk prioritization, which could ease the substantial engineering and analytical resources needed to perform the analysis.

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Questions for Commissioner Ostendorff
Senator James M. Inhofe

3. Has the Commission completed a review of the differences between the regulatory requirements and oversight in Japan versus what we do here in the United States? Can you share with the Committee what you believe to be significant differences and what they might mean with respect to the protection of U.S. plants?

Answer

The NRC has not conducted a formal review of the differences between the regulatory and oversight requirements in Japan versus what is done here in the U.S. The staff continues to monitor the events at Fukushima Dai-ichi in order to affirm that current regulatory requirements and existing plant capabilities allow for the determination that a sequence of events like the Fukushima Dai-ichi accident is unlikely to occur in the U.S.

Consistent with the NRC's mission, the NRC staff will continue to monitor all lessons-learned activities developed by domestic stakeholders and international counterparts to ensure public health and safety. In doing so, the NRC staff has learned from Japanese counterparts that they are looking to implement several actions in the near-term to ensure that their nuclear power plants continue to operate safely. Reports indicate that the Japanese are currently looking to re-structure their regulatory body to emulate the NRC/DOE model established by the Energy Reorganization Act of 1974. This change would modify their current regulatory structure and separate the promotion of atomic energy from its regulation. Additionally, the Japanese indicated that they are planning to implement many of the regulations for large area fires that the NRC implemented after the tragedies of September 11, 2001. Had these measures been in place at Fukushima Dai-ichi, additional equipment and strategies may have been available to help mitigate the effects of the earthquake and tsunami.

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Questions for Commissioner Ostendorff
Senator James M. Inhofe

4. For over six years, the NRC has been considering the license renewal application for the Pilgrim plant. This situation defies the NRC's Efficiency Principle of Good Regulation which states "Regulatory decisions should be made without undue delay." What would you say to Pilgrim's 650 employees who are wondering right now what their intermediate and long term employment prospects at Pilgrim are given the NRC's dismal record, even given that so-called "timely renewal" provisions allow operation after their license expires on June 8th? These people are wondering whether they will be able to provide for their families and pay their mortgages. When will you be able to give them an answer?

Answer

Consistent with the NRC's regulations and the Administrative Procedure Act, and the timely renewal provisions, the pendency of a hearing does not affect the licensee's ability to continue to operate the facility. The NRC has developed a comprehensive regulatory process and procedures for evaluating nuclear power reactor license renewal applications to ensure the continued protection of public health and safety if a renewed nuclear reactor operating license is issued.

The NRC's goal in contested license renewal proceedings is to conclude its review within 30 months from the receipt of the application. However, we are mindful of our responsibility under the Atomic Energy Act, the Administrative Procedure Act, and the Commission's rules to ensure a fair opportunity for public participation in that process. Where an individual or entity establishes that it has standing to request a hearing, (i.e., the person shows that its interests could be adversely affected) and includes at least one admissible contention (a specific issue of law or fact, supported by fact or expert opinion, and material to the NRC's licensing decision), NRC regulations afford that person an opportunity for a hearing on the license renewal application.

With respect to Pilgrim, the case has presented a number of highly complex, and novel, technical issues of first impression for the Licensing Boards and the Commission, as well as novel legal questions. The record in this case reflects that the Licensing Boards and the Commission have undertaken significant effort to resolve many issues in a timely and thorough way, taking the time needed to thoughtfully and fairly address complicated issues.

The schedule for the estimated completion of the typical license renewal review process serves as a guide, but such expectations must be flexible enough to allow for resolving unique safety or environmental issues that may arise on a case-by-case basis. Accordingly, the actual time needed to complete the adjudicatory hearing depends upon a number of factors including the nature and complexity of the legal, technical, environmental, and factual issues involved.

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Questions for Commissioner Ostendorff
Senator James M. Inhofe

5. Orders have been issued implementing post-Fukushima Tier 1 measures. Please describe whether these measures will make quantifiable improvements in the safety of our nuclear plants and how those improvements have been quantified.

a. If the benefits from the orders cannot be measured, please describe your rationale for imposing these requirements.

b. Was a cost-benefit analysis, such as that required by the NRC's backfit rule, utilized for any of the new requirements? If not, why?

c. How did each of you determine the amount of time that would be necessary for licensees to comply with the new requirements?

d. Did you consider whether the cumulative effects of complying with the new requirements could distract licensees from other important safety functions? How were these competing considerations balanced?

Answer

a. The benefits from the orders cannot be measured, per say. Although the NRC continues to affirm that continued operation and continued licensing activities provide a reasonable assurance of adequate protection to the public, the NRC's assessment of new insights from the events at Fukushima Dai-ichi led the staff to conclude that additional requirements should be imposed on licensees to increase the capability of nuclear power plants to withstand natural events beyond what they were designed to endure. As such, the Commission approved the NRC staff's implementation plan for the eight Tier 1 activities outlined in SECY-11-0137, "Prioritization of Recommended Actions to be Taken in Response to Fukushima Lessons Learned," dated October 3, 2011 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML11272A111). These Tier 1 items are being implemented by the NRC staff without unnecessary delay. The items include three orders that the Commission approved on March 9, 2012, based on (1) ensuring adequate protection under 10 C.F.R. § 50.109(a)(4)(ii) for the "Mitigation Strategies for Beyond-Design Basis External Events" and "Reliable Hardened Containment Vents (Mark I and II BWR)" orders and (2) an administrative exemption to the Backfit Rule under 10 C.F.R § 52.63 for the "Reliable Spent Fuel Pool Instrumentation" order.

(1) Mitigation Strategies Order – This order was modeled on Near-Term Task Force (NTTF) Recommendation 4.2, but was substantially enhanced in response to stakeholder feedback. It was issued to all reactor licensees, including holders of construction permits under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and a holder of a combined license (COL) under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." These licensees are required to develop strategies to withstand natural events beyond what plants were designed to endure, addressing multi-unit events and providing reasonable protection of

equipment identified under such strategies. This mitigation strategies order expands upon post-September 11th orders (issued to assure the continuation of adequate protection and requiring, in part, additional equipment to mitigate beyond-design-basis events) by incorporating operating experience and lessons-learned from the Fukushima accident.

(2) Reliable Hardened Containment Vents Order – This order was modeled on NTTF Recommendation 5.1, but was enhanced by stakeholder feedback. It was issued to all reactor licensees operating boiling water reactors (BWRs) with Mark I and Mark II containments. These licensees are required to have a reliable hardened vent to remove decay heat and maintain control of containment pressure within acceptable limits following natural events beyond what plants were designed to endure that result in the loss of active containment heat removal capability or prolonged station blackout. Similar to the mitigation strategies order, this hardened vent order clarifies current regulatory expectations by incorporating lessons-learned from Fukushima. The accident at Fukushima vividly illustrated the consequences of both unreliable vents and overly restrictive operational limits, which prevented earlier venting during an accident, contrary to U.S. practices. Further, the hardened vent order codifies current regulatory expectations by incorporating the extensive operating experience and risk insights with BWR Mark I and Mark II containment integrity over the past three decades. For instance, NRC regulations have not been updated to reflect hardened vent insights from Generic Letter 89-16 or the additional enhancements for venting in station black-out-like conditions following the September 11th orders and rulemakings.

(3) Spent Fuel Pool Instrumentation Order – This order was modeled on NTTF Recommendation 7.1, but was enhanced by stakeholder feedback. It was issued to all reactor licensees, including holders of construction permits under 10 CFR Part 50, "Domestic Licensing of Production and Utilization Facilities," and holders of COLs under 10 CFR Part 52, "Licenses, Certifications, and Approvals for Nuclear Power Plants." These licensees are required to have a reliable indication of the water level in associated spent fuel storage pools capable of supporting identification of pool water level conditions by trained personnel. Based upon my many years of nuclear propulsion plant operations, I know that a lack of reliable instrumentation can cause confusion and be a significant distraction that may adversely impact safe operations. In my view, given the significant radiological inventory in a typical spent fuel pool, spent fuel pools should have reliable instrumentation. Therefore, in the absence of a regulatory requirement, and in this rare occurrence, I approved the use of an administrative exemption to the Backfit Rule.

b. The NRC's Commission approved the issuance of the proposed orders on March 9, 2012, based on (1) ensuring adequate protection under 10 C.F.R. § 50.109(a)(4)(ii) for "Mitigation Strategies for Beyond-Design Basis External Events" and "Reliable Hardened Containment Vents (Mark I and II BWR containments);" and (2) an administrative exemption to the Backfit Rule under 10 C.F.R § 52.63 for "Reliable Spent Fuel Pool Instrumentation." As such, the basis for the NRC's issuance of these orders did not rely on, or require, a comparison of cost versus expected benefits.

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c. The NTTF concluded, and the staff agreed, that continued operation of nuclear power plants does not pose an imminent risk to public health and safety. In SRM-SECY-11-0124, dated October 18, 2011, the Commission directed the NRC staff to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." The NRC staff remains committed to this goal and has worked diligently with stakeholders, through a series of public meetings, to establish reasonable timeframes for licensees to comply with the new Tier 1 requirements.

   In evaluating potential implementation schedules, the NRC considered the complexity of the technical and engineering issues involved, other important safety enhancements being implemented by licensees beyond those related to lessons learned from Fukushima, and input from external stakeholders. Ultimately, the NRC established schedules that supported implementation of the new requirements during routine refueling outages at each nuclear power plant. To support the established schedules, the NRC staff anticipates issuing implementation guidance for the Tier 1 orders by August 31, 2012, and each licensee will be required to achieve full compliance within two refueling cycles after the issuance of the guidance, or by December 31, 2016, whichever comes first.

d. The NRC staff has considered the cumulative effects of complying with the new requirements and has been focused over the past year on making the necessary enhancements (i.e., regulatory requirements and existing plant capabilities) in a systematic, prioritized, and methodical manner. The NRC has prioritized the implementation of the Fukushima lessons-learned items into its existing work such that important safety issues such as implementation of fire protection enhancements and resolution of generic safety issues are not unduly impacted or delayed. The NRC has also worked diligently with the industry's Steering Committee and other stakeholders to establish reasonable timeframes and expectations for licensees to comply with the new Tier 1 requirements.

   The staff remains committed to meeting its established goal to "strive to complete and implement the lessons learned from the Fukushima accident within five years – by 2016." As the NRC works to achieve this goal, the Commission and staff will remain focused on ensuring that the new requirements do not distract licensees from important safety functions and, consistent with the NRC's mission, will ensure that the continued operation of U.S. nuclear plants does not pose an imminent threat to public health and safety.

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Questions for Commissioner Ostendorff
Senator James M. Inhofe

6. Explain the Commission's concern with, and programs in place to monitor, cumulative effects of the broad reach and great number of regulatory initiatives that are not limited to the staff's and industry's post-Fukushima efforts.

Answer

The concern with the cumulative effects of regulation (CER) is that it can potentially distract those we regulate from executing other primary duties that ensure safety or security. In SECY-11-0032, "Consideration of the Cumulative Effects of Regulation in the Rulemaking Process," dated March 2, 2011 (ADAMS Accession No. ML110190027), the staff proposed several rulemaking process enhancements to reduce CER. These enhancements included increased interaction with external stakeholders through the rulemaking process (including a public meeting during the final rule stage to discuss implementation issues), issuing guidance with rules, and requesting stakeholder feedback as part of the rulemaking process so that CER can be addressed. The Commission approved these enhancements and gave additional direction in its associated staff requirements memorandum. The staff is planning to conduct a public meeting in late May 2012 to obtain external stakeholder feedback on the CER direction/effort.

Practical limitations impacted the extent to which CER principles were applied to the post-Fukushima orders and requests for information. Notwithstanding those limitations, the NRC incorporated extensive public interaction into the development of the orders and requests for information. The NRC intends to maintain a high level of public interaction throughout the implementation of the post-Fukushima regulatory actions. To the extent practicable, the NRC will consider these actions when determining the implementation schedules of non-Fukushima related rules. External stakeholders will have the opportunity to make the NRC aware of implementation challenges throughout the rulemaking effort. The NRC is increasing its interaction with stakeholders during the regulatory basis phase of Fukushima lessons-learned rules, and each proposed rule *Federal Register* notice will include CER-related questions that seek feedback on implementation challenges. Finally, the NRC will conduct a public meeting focused on each rule's implementation during the final rule stage to ensure the NRC understands the unique implementation challenges that each rule presents and allows a reasonable implementation timeframe.

Senator BOXER. Thank you, sir, very much.

Commissioner Magwood, you said our nuclear plants are safe. I just want to point out that is exactly what the Japanese said before Fukushima. So I think we need to be cautious.

What I think the answer is, we are doing everything in our power to ensure that they are safe. And that is crucial.

So I have some questions. Chairman Jaczko, the NRC staff has proposed two rulemakings to implement high priority safety recommendations. I am very happy to hear everybody supported these. It is very, very heartening to me personally.

And one of those rules would require plants to have the ability to safely operate when they lose all electric power, a station blackout. Another rule would require emergency operating procedures and guideline to address severe accidents.

Chairman, when will the NRC propose and finalize these rules?

Mr. JACZKO. Right now, the station blackout rule, the first proposal, what we call an advanced notice of proposed rulemaking, is due this week to be finalized and then to be released to the public. The emergency operating procedures, the second rule you referred to, an advance notice is also planned for next month.

The station blackout rule, the Commission has asked for that to be done in about 24 months from now. And that would put it somewhere in the 2014 timeframe. The second rule right now I think is on a much later schedule to be finalized, closer to 2016 or sometime in 2016.

So I feel comfortable we are on a good track with the station blackout rule. That is a high priority, the Commission has recognized that. I certainly do have concerns that the second rule will be a challenge for us to not only complete the rule itself, but the implementations within the 5 years that I think the Commission has laid out. So again, I think part of our work in the next couple of years is to figure out ways we can get some of this work done a little bit more timely.

Senator BOXER. Right, because as I understand it the Safety Commission recommended that these all be done in 5 years; is that correct?

Mr. JACZKO. Well, the Commission itself encouraged the efforts to get these things done within 5 years. And we did have our Advisory Committee on Reactor Safeguards that encouraged some of the rulemakings be accelerated, the station blackouts in particular, because it is such an important piece of the Fukushima response.

Senator BOXER. Do you feel comfortable that on this issue, you are speaking for everyone when you say you are striving to meet that 2014 and 2016 date, you are striving? Because if not, I want to just ask, let me just not put you on the spot, because you can't speak for everyone. Does anyone disagree that those two rules, you should do everything in your power to implement the first one, 2014 station blackout and the second one, 2016? Is there any dissent?

OK. The NRC staff has stated that high priority safety recommendations should be implemented without delay. We talked about them, the NRC told its staff to strive by 2016. So I just want to make sure that you would keep us up to date, our Committee, on the progress being made so that if there is slippage we would

know about that. Would you do that, Chairman and Commissioners, if you see things slipping?

Mr. JACZKO. Absolutely.

Senator BOXER. Otherwise, we are going to assume it is on track, unless you tell us. I don't want to be surprised and find out it is going to take 12 years or 14, because that is what happened last time, after 9/11, the recommendations took I think 10 years or more.

Mr. JACZKO. Chairman Boxer, if I could just add right now, one of the areas where I do have some concern is with the efforts to re-examine the seismic hazards at the nuclear power plants. This is an effort right now that would probably push out to the earliest completion date, around some time in 2017, the latest completion dates for some—the lower risk plants into 2019. So that is one that at this point does appear to be off target a little bit.

And given the importance of seismic hazards, and I think as Commissioner Apostolakis said this is an area in which we recognize that there is new information that tells us that the plants may not be designed to the right seismic standards. For this one to be taking so long is a bit of a concern to me.

Senator BOXER. Well, I couldn't agree with you more. At another time in place, and also I will work with all of you, this is very concerning. Because in California we have updated reports that are not good, that say there has been a lot of changes.

Did you want to add something?

Mr. APOSTOLAKIS. Yes, I would like to add something. First of all, I agree with the Chairman's statement. There will be a lot of activities related to seismic upgrades. And right now the focus is on the plants east of the Rocky Mountains where the U.S. Geological Survey has issued new seismic data. And the staff will prioritize in terms of risk the activities there.

So a lot of it will have been accomplished before these dates, after the 15 years. It is that, according to the staff and my understanding, it is the plants with low risk that we will have to do some upgrades, perhaps, that will take longer. And the California plants, by the way, according to what I know today, will complete their upgrades before the 5 years.

Senator BOXER. Good.

OK, one last question. Chairman Jaczko, when the Fukushima reactors released large amounts of radiation, people were evacuated, and many have yet to return home. Does the NRC consider harmful impacts beyond the radiation exposure impact, including such things as evacuations, the clean up of contamination, when determining whether to require safety measures at our nuclear reactors? In other words, the costs and the benefit ratio would change, it seems to me, if the NRC considered what it would take. Just look at my southern California plant with almost 9 million people living within 50 miles.

So I am interested as to whether or not you consider harmful impacts beyond the public radiation when you determine the cost benefit of improvements.

Mr. JACZKO. We really don't. Our focus is really primarily on the direct and the short-term and then the longer-term direct health impacts from radiation exposure when we are making our safety

judgment. This is clearly an area that I think we need to look at and we need to examine. Because as you look at the Fukushima event that is really right now what is going to be the long-term impact. And it is significant.

Senator BOXER. It is. When I asked—and I am going to give everybody an extra 2 minutes because I have gone over—when I asked the sheriff near my San Onofre plant what she thought, I said, how do you get people out of here? She said, well, if it were to happen, an earthquake were to happen during rush hour, this is the road. And you can't even move on that road.

So it seems to me there needs to be more work done. Because radiation is the worst of the things that can happen. But being homeless is a whole other situation. Not being able to evacuate.

So I would like to work with all of you on that. Would you agree that you would be open to looking at that as far as cost-benefit ratio? Thank you. I see everybody nodding.

Senator Barrasso, you can go forward with 7 minutes, sir.

Senator BARRASSO. Thank you very much, Madam Chairman.

I think we have heard good news, U.S. plants are safe, there are steps to make them safer, and we are on the right path. I have heard that across the board. The views have evolved; there have been lessons learned. So I do have a couple of questions.

Specifically, there was actually a critical report that came out by a group called the Union of Concerned Scientists, critical of the NRC's response to address protecting U.S. plants. The report goes on, and I am going to ask Commissioners to comment on it, it says that U.S. reactors remain vulnerable to Fukushima-like severe disasters, the NRC does have a plan to reduce the vulnerabilities but must proceed more expeditiously to fully implement the lessons learned from Fukushima.

Their critical report goes on to say, unless the NRC strengthens measures to prevent and mitigate such beyond design basis accidents, it may be only a matter of time before a similar disaster happens here. I know you are very thoughtful on this; we have seen that views have evolved. I would maybe start with Commissioner Magwood, and tell me what your thoughts are on this report that seems to be critical.

Mr. MAGWOOD. Well, let me not overstate or take a defensive reaction to that. It is easy to be defensive on these things. But I think that the thought that UCS is bringing out, which is that we need to take action, is an appropriate thought. And the Commission fully agrees with that.

We have already agreed to take steps as a body and as an agency that will enhance the safety of U.S. plants, to make sure that a Fukushima-type scenario doesn't unfold. That said, I think that our infrastructure, our regulatory approach, the practices at our plants, our equipment, our configuration, our design bases would prevent Fukushima from occurring under similar circumstances at a U.S. plant. I just don't think it would happen.

But we can still improve, and we are going to improve.

Senator BARRASSO. Thank you.

Commissioner Svinicki.

Ms. SVINICKI. Senator Barrasso, I agree with my colleagues. I think the chairman has outlined the actions that we are taking in response to just that concern, to learn the lessons, to move forward.

I would say on the time lines, I think the Commission, to a person, has urged the NRC staff to come up with schedules that are implementable but yet have the appropriate sense of urgency about moving forward. I think they have done their best. I agree with my colleagues who say as we move forward we need to continue to look at those timeframes. If things can be accelerated, we should do that.

But I think right now we are moving forward on a solid plan. And as Commissioner Ostendorff mentioned, on a Commission that has strong and occasionally divided views, there was unanimous support for the actions that we have issued.

Senator BARRASSO. Great.

Commissioner Apostolakis.

Mr. APOSTOLAKIS. I disagree with the statements from UCS. I don't think that what happened at Fukushima can happen here. And I repeat, it was not unthinkable. They made terrible mistakes.

Senator BARRASSO. And you did comment that actually over the course of a year, I think your phrase was, my views have evolved. So it is helpful to know that people aren't kind of locked, decided, this is it. We can study more, learn more, and views can evolve in ways that can improve the situation.

Mr. APOSTOLAKIS. Yes, they have evolved. Yes.

Senator BARRASSO. Thank you.

Commissioner Ostendorff.

Mr. OSTENDORFF. Thank you, Senator. I agree with the comments of my colleagues. I also disagree with the UCS report, and I would like to make two comments. I agree with the Chairman's and Commissioner Apostolakis' comments on the seismic piece. I think we are concerned with the overall time period to look at seismic hazards. And I think our staff requirements memorandum that was issued a few days ago does request that our staff and industry look at ways that might be alternatives to speed up this process. I think we all want to move forward as quickly as we can. That said, I think we are doing it very responsibly.

The second piece, if I can comment just very briefly, Senator, is the Chairman—I agree with his comments completely on station blackout. I think one of the things to throw into the mix here is the fact that many of the nuclear power plants in this country, licensees have already ordered additional portable diesel generators, portable battery charging equipment, and other steps they are taking to enhance their ability to deal with the loss of all AC power. That is happening now.

Senator BARRASSO. Thank you.

I noted that a Member of Congress, Anita Lowery, recently wrote a letter to the NRC asking that the Commission expand the evacuation zone around nuclear power plants to 50 miles. It is a number—50 miles is something that the chairman just mentioned in terms of some of the specific plants in California. The NRC has had a report on NRC Clarifies Misconceptions about Emergency Preparedness. It states that it is important to note that the exact size and shape of the specific conditions at each site are unique and are

developed through detailed planning that looks at the specific conditions at each site and demographic information.

In addition, it says these zones are not limits and are meant to be expanded as necessary.

You are shaking your head, Mr. Magwood. Could you comment on that and your specific thoughts?

Mr. MAGWOOD. I think that statement is accurate. The emergency planning zones are just that, they are planning zones. They don't represent necessarily what would happen in the case of an actual emergency. In the case of an actual emergency we would respond appropriately depending on what was actually going on.

So I am comfortable with the regime we have in place. But I should say that as part of our post-Fukushima review the staff does anticipate a look at the 10-mile EPZ and the question about whether it should be expanded. So we will be analyzing that in the coming months and years.

Senator BARRASSO. And then a final question to all Commissioners. We talked about the chairman's statements February 9th, about the two potential paths and the futures 20 years from now, new nuclear plants licensed and the life of existing plants being extended, which of course is, in my opinion, the right path. The other future was for nuclear plants in a downward spiral of decommissioning.

Which path is the right one for us to be on now?

Commissioner Magwood, then we can run down the line.

Mr. MAGWOOD. I don't think those paths are really—will be decided by regulators. I think those paths will probably be decided by economic considerations that are beyond the scope of our agency. So I don't really have much more to say on that one.

Senator BARRASSO. And my time has expired. Thank you.

Thank you, Madam Chairman.

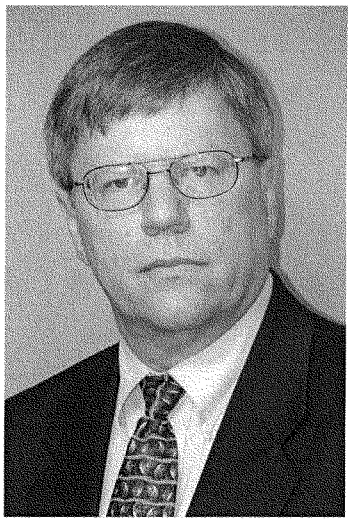
Senator BOXER. Thank you.

I am going to ask unanimous consent to place in the record the biography of the author of the Union of Concerned Scientists' report. His name is Dave Lochbaum, he is one of the Nation's top independent nuclear power experts. He has been quoted in the Wall Street Journal, all of our major newspapers. And he is—he has studied the crisis at Fukushima and issued this report. Since you are bashing it, I just through we would put his credentials, and I would match those against anybody sitting across from me.

[The referenced biography follows:]

Union of Concerned Scientists
Citizens and Scientists for Environmental Solutions

David Lochbaum is the Director of the Nuclear Safety Project for the Union of Concerned Scientists.



David Lochbaum is one of the nation's top independent experts on nuclear power. At UCS, he monitors safety issues at the nation's nuclear power plants, raises concerns with the Nuclear Regulatory Commission, and responds to breaking events, such as current concerns over aging power plants and plant fire safety.

Mr. Lochbaum is a nuclear engineer by training and worked in nuclear power plants for 17 years. In 1992, he and a colleague identified a safety problem in a plant where they were working, but were ignored when they raised the issue with the plant manager, the utility, and the Nuclear Regulatory Commission. They decided to go to Congress, and the problem was eventually corrected at the original plant and at plants across the country. Concerned about nuclear safety and frustrated with the NRC's complacency, Mr. Lochbaum joined UCS in 1996. Mr. Lochbaum left UCS in 2009 to accept a position as a reactor technology instructor at the NRC's Technical Training Center. Mr. Lochbaum returned to UCS in his old position in March 2010.

He has written numerous reports, including *The Good, the Bad, and the Ugly: A Report on Safety in America's Nuclear Power Industry, Three Mile Island's Puzzling Legacy,* and the book *Nuclear Waste Disposal Crisis.* He is widely quoted in the media and a frequent guest on network news programs.

Senator BOXER. And I just want to say, when we bash a report, maybe we will just have to have them come up here. I think we are going to do that in the near future.

I am turning it over to Senator Carper.

Senator CARPER. Earlier in your statements I think you indicated two of you traveled together to Japan to personally visit the area where the incident or the disaster occurred. I think it was probably closer to a disaster myself.

Just give us a sense for the views of the people of Japan toward our intervention, toward the assistance that we provided for them. I would be interested in hearing that. Sometimes we help folks in distress. I was in Pakistan a year or so ago after a big flood. We were providing enormous help for a million or so refugees. I didn't feel a lot of understanding or appreciation for that.

I would just welcome what you felt when you were in Japan in terms of the recognition of the work that we have done to help them.

Go ahead, Commissioner Ostendorff.

Mr. OSTENDORFF. Senator Carper, I think that is a great question. I think all of us have had different interactions. But I think we have heard nothing but gratitude and tremendous thanks offered to the U.S. Government, the military, to the NRC, to the Department of Energy, and other cabinet agencies. I know that when Commissioner Magwood and I were in Japan in the middle of January, we received a lot of thanks. I know that a number of us were at a Japanese embassy event last week where we also received thanks, along with other sectors of the government in this country.

And the Chairman led a commemoration ceremony this past—just 3 days ago at the NRC, where the Japanese Ambassador to the United States also passed on his significant thanks to our country. I think it has been very positive.

Senator CARPER. Commissioner Magwood.

Mr. MAGWOOD. I echo that. I have had a lot of conversations with people from Japan, and there is a great deal of appreciation for the contributions of NRC in particular. I think a lot of people recognize the expertise NRC brought at a critical time was very important.

But really, to the overall U.S. response, I heard a lot of really positive things about our military and particularly the Navy and the response that the Navy provided to the incident, helping logistically and providing supplies. So I think we have made a lot of friends in Japan in the last year.

Senator CARPER. Good.

During the time that you were there or the time since, would you just share with us how many lives were lost because of this disaster?

Mr. MAGWOOD. Because of Fukushima?

Senator CARPER. Yes.

Mr. MAGWOOD. That we are aware of, none. I believe that there were two people who were killed at the plant when the tsunami swept in; they were drowned. But other than that I am aware of no fatalities or no expected fatalities resulting from the nuclear incident.

Senator CARPER. Do any of the Commissioners have different information on that?

Commissioner Svinicki.

Ms. SVINICKI. Senator Carper, in addition to the two workers who I also understand were immediately drowned onsite in the event, I am aware of two workers that had been engaged in the heroic recovery efforts under extremely uncomfortable and adverse conditions. I understand that these two individuals have died of heart attacks. I don't know the direct relation, but some of the workers have to work in anti-contamination clothing. It is very hot, it is very uncomfortable, and it may be that they had a stress reaction.

But heroic efforts to recover after the event, of course, required tremendous efforts by workers. I am aware that two additional workers—it was not a radiological event, but it was a heart attack from the extreme efforts they were making.

Senator CARPER. All right.

Just before I move on to my other questions, in the United States, since the first nuclear power plants were built, how many lives have been lost? Does anybody know or recall, off the top of your head?

Mr. OSTENDORFF. Senator, I believe the answer is none, as far as any deaths due to radiation exposure at a nuclear power plant in this country or any of our nuclear-powered warships.

Senator CARPER. Does anybody have different information?

Mr. JACZKO. At the risk of being contrary here, I think it is just very important that we not send a signal that Fukushima was not a significant incident.

Senator CARPER. I don't think anyone is suggesting that.

Mr. JACZKO. Certainly I have been in international meetings where people have asked similar questions and insinuated that it is really an event that we can ignore because of that. And I think it is very important——

Senator CARPER. Let me just interrupt you. You can stop. Think of the lives of people, where they live, 12 miles around, in a radius around Fukushima of 50 miles, their lives have been badly, badly disrupted and in many cases will be so for years. So no one is attempting to diminish that.

I chair the subcommittee here on clean air. We have had any number of hearings here in recent years where we talk about the number of people, not whose lives have been disrupted but who have been killed in this country because of dirty air, because of the dirty air that we breathe put out by utilities, which in many cases blows from the Midwest to my part of the country, where Senator Sanders and I happen to live and represent people.

So I just think we need to put this in a little bit of perspective, and I appreciate you helping us to do that.

Anybody listening to this, and this hearing is televised, I believe at least on C-SPAN, but anyone listening, they may be thinking, what is an order, what are these different tiers, these letters, people trying to make some sense of it. Can somebody just in about a minute just try and explain so that a regular American citizen watching this hearing would know what we are talking about, please?

Commissioner Svinicki.

Ms. SVINICKI. Senator, in perhaps layperson terms, an order is a set of compulsory actions that the NRC has authority to issue to private entities such as nuclear power plant operators. So under our authorities to regulate nuclear safety, we can issue a directive or order to compel actions. And Chairman Jaczko has described what those actions were, so when we say orders, it is separate from the long process of establishing a new regulation. We can through an order take action very quickly.

Senator CARPER. And how does an order differ from a letter, please?

Mr. JACZKO. Well, an order is a requirement that a power plant has to take. The letter is kind of the first step in gathering information. So it is something that they have to tell us; it is information that they are required to provide to us. But in and of itself it doesn't necessarily direct any particular action. So in many cases it will be the precursor to additional action as we gather the information.

Senator CARPER. And I will stop with this, but I understand that in terms of the agreement among the Commissioners has there been unanimous agreement on the orders that have been issued. And essentially unanimous agreement in terms of the, what is Tier 1, what should be a Tier 2 and a Tier 3 and the time line, is there broad agreement on those points?

[Witnesses respond in the affirmative].

Senator CARPER. That is good. That is encouraging. Thank you.

Senator BOXER. Senator Inhofe.

Senator INHOFE. Madam Chairman and members here, I just came to apologize for not being here. We are doing our Armed Services Committee hearing right now, and if it is all right with you, I want to pass for a moment here to reprogram my mind.

Senator BOXER. Absolutely.

Senator Sanders.

Senator SANDERS. Thank you, Madam Chair.

I want to pick up on a statement that Commissioner Magwood made a moment ago in response to question from Senator Barrasso. When the Senator asked him about the future of nuclear power in this country, as I heard Mr. Magwood, he said the future of nuclear power in America will not be primarily made by the Commission but by "economic considerations."

And I strongly disagree with what Commissioner Magwood said, because the future of nuclear power will 100 percent be determined by whether or not the taxpayers of this country continue to provide huge, huge financial support to the nuclear power industry for the indefinite future. That is the issue.

And I always find it amusing that at this moment in American history, when we have a $15 trillion national debt, when our middle class is declining, when poverty is increasing, and I have many of my friends, many on this Committee, who say we have to cut Social Security, we have to cut Medicare, we have to cut Medicaid, we just can't afford it. But when it comes to taxpayer support for nuclear power, there is no end in sight. Billion after billion after billion.

So here is my question for the Commission. And correct me if I am wrong, now. My understanding is that the nuclear power indus-

try is unable to get support insurance from Wall Street and the private sector because it is too risky, and that we have a Price-Anderson piece of Federal legislation which guarantees that if, God forbid, there is a major nuclear power disaster in this country, taxpayers would have to pay billions and billions and billions of dollars in liability. Am I wrong on that?

Mr. JACZKO. Senator, the way I would characterize it, there are really two tiers to the Price-Anderson system. The first tier is private insurance.

Senator SANDERS. Absolutely. And if it's a disaster, say a $50 billion disaster, would the taxpayers of this country have to pay tens of billions of dollars?

Mr. JACZKO. Beyond the $15 billion.

Senator SANDERS. Now, many of my good friends here say, well, get Government off the backs of the business community. So why doesn't nuclear power go to Wall Street and the private sector and get that insurance?

Mr. Magwood, we believe in the genius of the private sector. Why isn't Wall Street helping out the nuclear power industry, and why not?

Mr. MAGWOOD. Well, the only thing I can really say to that, Senator, that I am aware of, no one has actually tried to go to Wall Street to do this.

Senator SANDERS. So the Federal Government steps in because nobody in the nuclear power industry can get on the phone and call up Wall Street and say, we don't want taxpayer support; we don't like the Federal Government? No one has thought about going to the insurance industry?

Mr. MAGWOOD. And the Price-Anderson structure has been in place for a very long time.

Senator SANDERS. That is right. Would you agree with me that maybe we want to, because we are so concerned about our deficit, that we may want to end Price-Anderson?

Senator Barrasso, are you going to work with me on that? Because we don't want the Federal Government getting involved in the private sector, right?

All right, you have no comment.

Second thing. The new plant in Georgia is going to require, as I understand it, about $8 billion of loan guarantees. So my question, once again, the Federal Government, why are we getting the Federal Government involved in the genius of the private sector? Why do we need loan guarantees? Why aren't they going to Wall Street if nuclear power is so safe and can make profits for the industry? Am I right in saying that in fact we have proposals now for tens of billions of dollars in loan guarantees for the future of the nuclear industry? Anyone disagree with that?

Last point I want to make, if we are going to get rid of the waste that exists, nuclear waste in Vermont and plants all over the country, it is a very, very expensive proposition. Do you think we can get private sector to get involved in that rather than tens of billions of dollars of Federal money? Anyone think that is a good idea? I don't hear that.

So here is the point. The point is that despite all the talk of many of my friends about how the Government should not be in-

volved in picking winners and losers, of course the Government 60 years ago picked a winner. And that winner is the nuclear power industry. Tens and tens and tens of billions of dollars of direct subsidies are going to that industry.

Now, my last question in this regard is, when does it end? I am a believer in sustainable energy. I think it is absolutely appropriate that when you have new technologies it does receive Federal support. The nuclear industry is now in this country 60 years old. It is a mature industry. When do we get it off of the Government welfare programs? When does it begin to stand on its own?

Is 60 years enough, Mr. Magwood? How many more years do you foresee the Federal Government having to support the nuclear power industry?

Mr. MAGWOOD. As I indicated earlier, the economic issues are really beyond our scope.

Senator SANDERS. Whose scope is it? Do you think the Federal Government is going to be there another 60 years supporting these guys?

Mr. MAGWOOD. I think I would defer the question to the Department of Energy.

Senator SANDERS. Well, that really—Ms. Svinicki, how many more years do you think the Federal Government has to subsidize nuclear power?

Ms. SVINICKI. I see these as policy deliberations that occur in the Congress. The loan guarantee program is in law and executed by the Department of Energy.

Senator SANDERS. Mr. Chairman.

Mr. JACZKO. Senator, when we look at nuclear power plants, one of the things we want to make sure is that they have the financial resources to be able to support safe operation.

Senator SANDERS. Right.

Mr. JACZKO. And so it is very important that these utilities can finance the plants, that they can ensure that they have appropriate work force. So in the end these finances do have an impact on safety. And it is important——

Senator SANDERS. But why can't the private sector make them safe? My friends over here tell me about the genius of the private sector. They don't want the Federal Government involved in all kinds of private sector activities. Why can't the private sector pay for that?

Mr. JACZKO. Well, I think, Senator, as you know, we try and stay out of those specific decisions and try to remain as an objective determiner of safety. And no more would we want to make safety decisions that are based on cost, I think, in a good way than in a bad way.

Senator SANDERS. Mr. Apostolakis, how many more years does the Federal Government have to continue to subsidize——

Mr. APOSTOLAKIS. Senator, I think these are decisions for the political leadership of the country, not for the Commission.

Senator SANDERS. OK.

Mr. Ostendorff, how many more years?

Mr. OSTENDORFF. Senator, I don't have anything to add to what my colleagues have said.

Senator SANDERS. Let me just conclude. The Federal Government has picked winners and losers. The big winner is the nuclear power industry, and all of my conservative friends who want the Federal Government not to be involved in energy are very silent on their desire to pump tens of billions more into nuclear power.

I yield back.

Senator CARPER [presiding]. Senator Inhofe.

Senator INHOFE. Thank you, Mr. Chairman. First let me again apologize for not being here because of the conflict with Armed Services, which is still going on.

Let me start off by saying the short response to our good friend Senator Sanders is, I disagree with everything he is saying.

[Laughter.]

Senator INHOFE. But what I would like to do, Mr. Chairman, I had made a request back in December. In December I asked the question for the record that you would send me something, in talking about this allegation of harassment and intimidation that you are being accused of. And I would ask what actions you plan to take to address the allegations of intimidation for safety managers. Do you want to respond to that briefly?

Mr. JACZKO. Well, I think, Senator, I certainly appreciate your question. I think as I talked about at the last hearing, if there is any time I have ever done anything unintentionally to cause anyone to feel——

Senator INHOFE. No, the accusations are there. I am saying, how are you going to respond to the accusations of intimidation and these things?

Mr. JACZKO. As I said, I think at the last hearing, I think that I have never done anything intentionally to intimidate or do the things that I think were being talked about the last time. So in the end, what I think I am interested in is making sure that we continue to do our job, that the staff is continuing to be focused on our important safety mission, that the Commission continues to make timely decisions in an effective way.

Senator INHOFE. OK, that is good, that is what you said last time.

Let me just get to this thing on, first time in 34 years we have issued licenses to build two new reactors. We want to move forward with this. And Mr. Chairman, you had said you split with the rest of the Commission. And you said, I can't support issuing this license as if Fukushima had never happened.

Now, I want to ask any of the other four Commissioners who would like to respond to this, No. 1, get into the record, unless it happened before I came down here, the differences between the regulatory performance in Japan and the United States. I am talking about the fact that they didn't have an independent NRC, which we put together back in 1974. I'd like to have one of you kind of describe to us the differences and then what Japan is doing now copying the progress that we have made.

If any of you—let's start with you, Mr. Ostendorff.

Mr. OSTENDORFF. Senator, thank you for your question.

Just briefly, Commissioner Magwood and I were in Tokyo on January 18th and met with our counterparts at what is called NISA, the NRC's counterpart agency in Japan for regulation of

their nuclear industry. We had long discussions with the NISA leadership about their plans to reform their regulatory structure.

I do think they were borrowing heavily from the United States' model. But I would also say that they are looking at enhancing independence. They are trying to increase technical competence in their leadership. And the Japanese, through their own reports, have acknowledged there are some significant improvements they need to make.

So I think——

Senator INHOFE. Improvements based on some of the things we have done?

Mr. MAGWOOD. And also an assessment of where their system in some areas came up short.

Senator INHOFE. OK.

Any of the rest of you want to comment as to some of the basic differences that they are facing over there, not you, Mr. Chairman, we have already heard from you, the others, in terms of what they might be getting from us? The point I am trying to make here is what happened over there and what happens here, we are talking about two totally different things, a different system, different geology, different weather patterns, and all that. Maybe you could address some of these differences. Because we keep hearing this, and of course the chairman has said we don't want to move forward until we explore Fukushima more.

Mr. APOSTOLAKIS. There are, I think, a couple of things that stand out, if you look at what happened in Japan. The first one is what you just discussed with Commissioner Ostendorff. The regulatory authority there, NISA, was very weak technically. And they didn't have the amount of independence that we have, for example.

The second is more technical; it has to do with the tsunami calculations. They were very poorly done, let's put it that way. They ignored data from the past. There was a report by some technical society in Japan a couple of years ago that pointed out that they had to update the tsunami calculations, and that was not done.

So these two things, it seems to me, stand out. There were both organizational issues and technical issues.

Senator INHOFE. And the fact that they had not ever put together an independent source, like you folks, right now, the NRC.

Any comments on that, Mr. Magwood?

Mr. MAGWOOD. Senator, this is something that the Japanese government is wrestling with right now. They are spending a lot of effort to try to reform their system. They know that there are issues. I have discussed with Japanese officials the issue of independence of regulation, for example, the quality of technical expertise in the regulatory organization. And to be honest I think they are right in the middle of wrestling with this, and I don't think they have reached any conclusions yet.

So I hesitate to really give much of a firm opinion about the state of things. But I do agree with the thrust of your question. Those are issues, particularly the independence of the regulatory agency, that I think will be essential if they are going to rebuild the trust that a regulator must have with the public.

Senator INHOFE. Ms. Svinicki.

Ms. SVINICKI. Senator, I agree with the comments of my colleagues. One item that I would add is that I think that the Japanese acknowledge that their, what I will call command and control structure, in this crisis situation was severely challenged. And even in circumstances where decisionmaking is well established and well rehearsed, in times of crisis it becomes very difficult. I think the Japanese now understand that the decisionmaking lines of authorities were not as clear as they needed to be for a severe accident situation.

Senator INHOFE. I appreciate it.

Mr. Chairman, I just want to continue to get on the record how important it is that we develop our nuclear energy. I sit back and I see that it is accepted now that we in the United States have the largest recoverable reserves of oil, gas, and coal of any place in the world. Our problem is a political problem that won't allow us to exploit our own resources. We are the only country in the world that does that.

And I see a similar thing here, too. We have this opportunity that is out there, and we want to exploit it. It was quite a number of years ago that I was the Chairman of this Subcommittee, when the Republicans were in majority. At that time we hadn't had an oversight hearing in 12 months, and we started changing things around, started moving forward, getting into the safety of all this. And I regretted when Fukushima came along, somehow people are assuming that there is—that that threat is here, when in fact the point we want to keep hammering is, it is not.

So between the opportunities that we have out there with oil, gas, and coal, and nuclear, we can solve this problem. Numerically, we have all given speeches as to how long it would take. People are concerned about our dependence on the Middle East. We don't have to be dependent on the Middle East if we just exploit our own resources. A very important part of that is nuclear energy.

Thank you, Mr. Chairman.

Senator CARPER. I was born in West Virginia, my colleagues, I don't know if you know that. It is a big coal State.

Senator INHOFE. I knew that.

Senator CARPER. I take pride in the fact that the United States is recognized as the Saudi Arabia of coal. Given what we are learning about our natural gas resources, it appears we are the Saudi Arabia of natural gas. I understand we are in a position now to begin fairly soon to actually liquify it and begin exporting natural gas.

Like my colleagues here I believe and have for a long time believed that nuclear energy has to be an important component of our portfolio of sources of energy in this country done right. And we have worked hard over the years to make sure that it is done right. It has not been perfect, but we always know if it isn't perfect we try to make it better.

One of the reasons why—I am sorry that Senator Sanders had to leave, but one of the reasons why we believe it is important to ensure that we have a vibrant nuclear industry going forward is what I alluded to earlier. I am not aware of anyone, I asked how many people died in nuclear accidents, radiation accidents, in the history of this country. One of the virtues of nuclear power is that

it doesn't emit sulfur dioxide, nitrogen oxide, mercury, CO_2, we don't have to worry about contributing to climate change or global warming. It doesn't poison us in our lungs; we don't have folks dying because they are ingesting the waste that comes out of the smokestacks of other utilities around the country.

And in terms of the money—I don't know if anybody has ever sat down, Senator Inhofe, and tried to figure out how much money we have saved from the 100 or so nuclear power plants that we don't have to pay through Medicaid or Medicare for folks to go to the hospital, to doctors' offices for treatments, for funerals, for enormous numbers of costs. It would be interesting to run the tab on that and see how much we add up to in savings.

There is, I think, a rationale for investing some Federal dollars in loan guarantees for the opportunity it costs to avoid all those health care costs that are otherwise burdensome, helping to bankrupt Medicare and putting a huge burden on States for their Medicaid costs. I just wanted to get that out there.

I will say this to the panel: it is my understanding that the Commission has decided to move ahead with a rulemaking to address what a facility should do if it experiences a loss of all electric power, referred to as station blackout. However, the NRC expects utilities will have up to December 2016 to comply with this new rule once it is final.

It is my understanding that losing all electrical power for a long period of time was the underlying issue behind much of the equipment failure at Fukushima. My question would be, is the NRC requiring the nuclear power plants in this country to address these issues in any way from now until when the rule would become final?

Mr. JACZKO. I think as was mentioned, we did issue an order which requires additional equipment to help mitigate the impact of a loss of all electric power. So that basically means you have additional portable generators, power supplies, and fuel, these kinds of things, and the ability to connect that power into the vital systems.

So that is kind of the short-term enhancements that would be there to get us through to the point at which we have the more permanent changes made.

I would also add that right now we do have a requirement that plants deal with this complete loss of electric power. Right now we think those requirements are not sufficient, that they don't require them to be able to deal with this situation for a long enough period of time, that Fukushima showed us is probably much longer, days rather than hours that they have to be able to cope with this situation.

So there is not completely a void of requirements in this area. But we don't think right now that it is really where we want it to be in a few years.

Senator CARPER. Do any other Commissioners want to add to that?

OK.

My next question is, during the December 15th hearing, about 3 or 4 months ago, I asked Chairman Jaczko if the day to day NRC staff work was being compromised with the staff working on the Fukushima recommendations. I specifically asked about the licens-

ing process for new reactor and the relicensing process for our current reactors.

Chairman Jaczko responded that there may be some delays in the relicensing process for our current reactors due to the constraint of resources. I followed up with a question for the record for all of you. It asked how many staff were working for relicensing leading up to the Fukushima crisis and how many are working on relicensing today. You all answered me the same answer, I believe, that 82 employees were working on relicensing before Fukushima, and 77 are working on it now.

And that doesn't seem to be a large shift of resources, a modest shift of resources. But I also asked how many additional staff are needed to ensure that there are not any delays. And I did not get a clear answer from any of you.

So let me just ask again, if I can. Is the day to day NRC staff work being compromised with the staff working on Fukushima recommendations? Do you expect delays in licensing and/or relicensing because of that? And if there are any extreme gaps that will reduce performance, what do you need, if anything, to fill those gaps?

And that would be for the whole panel. We will start with Commissioner Ostendorff, and we will just go to your right.

Mr. OSTENDORFF. Senator, I am not aware of any significant impacts that Fukushima is having on licensing. There are some small impacts. I think Bill Borchardt, who is here in the room today and is our executive director for operations, is doing a very good job of managing priorities for staff work. So I am not aware of there being any significant impacts.

Senator CARPER. All right.

Commissioner Apostolakis.

Mr. APOSTOLAKIS. I agree with Commissioner Ostendorff.

Senator CARPER. Mr. Chairman.

Mr. JACZKO. Well, there certainly are impacts. We have put a large number of people working on the Fukushima efforts. So low priority activities will not be done in the area of licensing. Probably the most significant impact is in the area of extended reviews of so-called power uprates. Those will likely take longer than we originally had anticipated. But again, nothing that would have certainly an impact on safety and our safety efforts and our safety oversight will continue in that area.

So if there is a shortcoming it is not so much in the area of financial resources, it is simply expertise and staff expertise that we just don't have, and additional finance resources won't necessarily improve.

Senator CARPER. Good. Thank you.

Commissioner Svinicki, please.

Ms. SVINICKI. Senator, I have no different information than the written response I provided to the Committee on March 5th. But I would just emphasize my agreement with Chairman Jaczko: it is both resources and what we call critical skill sets, meaning that some of these issues require niche expertise, and we have a limited number of some experts.

Senator CARPER. All right, thank you.

Commissioner Magwood, please.

Mr. MAGWOOD. I think my colleagues have covered it. I don't think I have much to add except to say that I have asked this question multiple times within the agency to make sure I understand how our Fukushima efforts have impacted things like license renewal activities. It seems that, as one of my colleagues mentioned a minute ago, that the staff has been able to manage through this very effectively and has been able to where, if a particular person is necessary to be moved to work on Fukushima, there was another person ready to backfill that was prepared to take on that work.

So we have been able to manage this effort without a major interruption of our important work.

Senator CARPER. Good. Thank you all for those responses.

We have been joined by a Senator, not just any Senator, but a Senator from New Mexico, Senator Udall.

Welcome, you are recognized.

Senator UDALL. Senator Carper, thank you very much, and thank you to the Commission for being here.

I first wanted to ask about—several of the priority recommendations from the NRC may not be implemented until 2016, 4 years from now and 5 years after the Fukushima disaster. The average American, it seems to me, expects the Government to keep them safe from disasters at nuclear power plants. Why does it take 5 years to implement the short-term safety recommendations following the worst nuclear disaster in a generation?

Mr. JACZKO. I think the one area right now where we know there will be some challenges is in the area of seismic, analyzing the seismic or earthquake risks at nuclear power plants. I think the simple answer to that is that the industry does not have the experts to do this. And I think that is indicative of the fact that this is not an issue that we probably paid enough attention to in terms of updating our requirements, updating our standards, updating our skill set and our knowledge base.

That has clearly, I think, been exposed as a weakness. And that is why it is going to take us time, because there are limited people who can do these kinds of analyses, so they are going to have to be shared among the very licensees that need to do this work.

So I think in that area in particular, it is part of the reason.

Senator UDALL. Are there any other reasons why? In that area I can understand that. Are there other reasons?

Mr. JACZKO. Well, there is a certain point at which this is technically complex. And it does take some time to do these analyses. It takes time to then— once, for instance, we understand what the problems are at a plant, then proposals need to be made about how to fix those. Those changes then ultimately need to actually be made in the plants themselves.

So that work does take some amount of time, and we can't unfortunately do these things overnight. But I think it is reasonable to shoot for a target to get it all done within 5 years. And that means getting all the parts of the plants changed as well. I am not confident right now that we are on target to do that for everything we need to do.

Senator UDALL. Do any of the other Commissioners have comments on that question or on what the chairman said?

Please, go ahead.

Mr. OSTENDORFF. Senator, I appreciate the question very much. I would just like to comment that a foundational element to the Commission's actions here had been the Near-Term Task Force's findings that there is no imminent risk from continued operation of our existing nuclear power plants. If there had been a finding of imminent risk, we would have shut them down. We did not find there is imminent risk.

So a more measured approach is appropriate, given that foundational entering assumption and finding.

Senator UDALL. Please.

Mr. APOSTOLAKIS. I would like to add that, I mean, maybe the impression is that we are doing something about seismic now. I mean, this has been an issue that has been of concern for decades. And the plants have been found safe by our staff.

There is some new information from the U.S. Geological Survey that now is being evaluated. So it is not like we are looking at the issue for the first time. They are safe as far as I am concerned.

Senator UDALL. Commissioner Magwood.

Mr. MAGWOOD. Senator, I appreciate your question on this. I think one of the things that is very important to emphasize—and I think Commissioner Apostolakis mentioned this in an earlier response—as the agency goes through this process we will be prioritizing based on the hazard and risk presented at each individual plant site. So I think you will find that as we move forward, you will see us having greater activity on sites that, after we go through the initial hazard assessment, we will deal with the plants that need to be dealt with first.

So I think that where the risk is highest we will take action sooner. I think that is an appropriate way to proceed.

Senator UDALL. Thank you.

I understand there are dozens of nuclear power plants across the country whose operating licenses are about to expire. These plants are seeking to extend their licenses for another 20 years beyond the original predicted life span of the plants. Do all U.S. nuclear plants have to meet all the newer safety standards, or do older plants get exemptions from new standards?

Mr. Chairman.

Mr. JACZKO. Well, in general, as we get new requirements we will in some cases require plants to update to those new requirements, and in some cases we won't. It depends on the particular issue and the particular way in which the plant was licensed. If you go back to the very first plants that were licensed in this country, they were not licensed at a time when we had kind of a generic set of basic safety requirements or basic design requirements. So some of those plants are licensed to a very different type of standard than other plants.

So there is variety in the way the plants are licensed and the requirements that have been applied to different plants. When it comes to the relicensing itself, we don't do a kind of a de novo review. It is like when you get a driver's license, every 5 years you have to get—or 10 years, whatever the frequency is—to get your driver's license extended often you send something in the mail, and you get a new license.

Well, our license renewal is not a brand new licensing action, much like going in and taking a driver's test again and doing all the things in the written test that you would do initially getting a driver's license. We don't require that for license extension. We require that they have programs in place that we review to ensure that the plant will deal with the aging of the components that are important to safety. That is the decision we have made and really the basis for our decisions about license extension.

Senator UDALL. Do any of the other Commissioners, do you have thoughts or comments on that question?

Mr. APOSTOLAKIS. I think the chairman is right, that we look at the subset of the requirements for the license extension. But once the license is extended then they are subject to all of our orders that apply to everything else. They are just treated like any other operating plant.

Senator UDALL. The point here though is if they have been given exemptions in the past and then post-Fukushima, are you going to re-look at those and see, are those safe in light of what is going on and what you have learned from the process and the accident.

Mr. APOSTOLAKIS. I am not aware of any exemptions. And the orders we issued this week apply to everybody.

Senator UDALL. Can I do one more question?

Senator CARPER. I don't know, what do you think?

Senator UDALL. Oh, Senator Barrasso is here, I didn't see him.

Senator CARPER. Go right ahead.

Senator UDALL. I will wait.

Senator CARPER. We are just here to listen to you.

[Laughter.]

Senator UDALL. Mr. Chairman, nuclear power makes up about 80 percent of the French electricity supply. The French nuclear industry is quite different than ours, with a much more involved, as you know, government role. I was interested to learn that regulators there are going to require safety equipment designed to survive disasters even worse than what the plants are designed for. In the U.S. apparently the nuclear industry is taking the lead in updating emergency equipment prior to the NRC action.

When is the NRC going to implement a similar requirements in the U.S., and what are the key differences between the two national approaches?

Mr. JACZKO. I am reluctant to too much characterize what the French are doing because we focus more on what we are doing, and that has occupied a bit of our time. But the basic ideas, I guess I would say, for what we are doing here is really to get at preventing these kind of very severe accidents, which means making sure that all the plants can handle the external hazards, earthquakes, flooding, other challenges like that, then really on mitigation. So if you get into a situation in which Mother Nature does something we didn't plan for, then you can minimize the likelihood of a very severe accident, which means new equipment, new procedures and other enhancements to the system to deal with that.

The last piece is to make sure we have a robust emergency preparedness system to respond in the event that all those other things we planned for fail. So that is really the approach that we

have taken, is to try and bolster each of those three areas with some new requirements in some regard.

My limited understanding of what the French are attempting to do is to, if you will, to kind of harden everything, make everything a little bit more robust, with greater physical infrastructure to protect equipment from external hazards, to ensure that you have an additional way to control the reactor. That is in a hardened facility. So some of the things that they are doing are things that we have already required even before Fukushima for some of our plants. Sometimes it is a little bit hard to compare the changes they are making to the changes that we are.

But I think in general in the international community there is a lot of consensus about what really needs to be done. I think in general we are moving forward relatively consistently. But there are differences just because of the uniqueness of each country and its regulatory program.

Senator UDALL. Thank you on that. The thrust of my question was just to get to the issue of safety, and are other countries pushing more into safety. And in hindsight, if we do have, which none of us want, future disasters, is it going to be found that they took actions that they had the safest plants? All of you have said over and over again, we have very safe nuclear plants. So I hope that you are looking at everything that we do, from exemptions to additional policies that are going to be put in place, new licensing to make sure that we have the safest nuclear plants in the world.

Thank you for that, and I very much appreciate, Senator Carper, your courtesies, and Senator Barrasso. I am going to slip out for a meeting here but I may come back and ask an additional question.

Senator CARPER. Good. Let me just say, you asked excellent questions. One of the things that we are trying to do here is to learn from the disaster. Einstein used to say in adversity lies opportunity, terrible adversity in Japan, opportunity for us to learn, to make sure that we can avoid some problems and mistakes that they made.

And you referred to France as well; I had the opportunity to go over and take a look at what they are trying to do in terms of reprocessing spent fuel rods and that kind of thing. Somebody somewhere around the world is going to figure this out. Somebody is going to figure out how to do it, and they are going to figure out how to derive additional energy from the spent fuel rods and reduce the amount of time that they have to be stored. And folks up at MIT, where Dr. Apostolakis comes from, they have been working on this and a lot of other places as well. The French have been working on it for a number of years. We will figure this out eventually.

And when somebody does, I hope we are the first. But I think we will probably, in the end, we are going to need some repositories around the country to store the stuff for an indefinite period of time. We don't need them immediately. But the idea of learning from others in the world, they can learn from us, and we will learn from them as well.

Senator UDALL. Senator Carper, I did—like you, I went to France, and I spent 2 weeks, and I toured their nuclear plants. The

big question I had, because as you probably know, New Mexico has the first, for transuranic waste, it is called the Waste Isolation Pilot Project. So I was trying to find out from the French, because they are putting all their eggs in the nuclear basket, where are they moving in terms of permanent storage of waste.

The question, after I kept asking the question in place after place, to group after group, they said, we were waiting for America to find a permanent solution.

Senator CARPER. Well, that is good. When were you there?

Senator UDALL. I was there in the period when I was State attorney general and had the opportunity to travel over on a program that was an exchange. I think I was there in about 1995, 1996.

Senator CARPER. Good.

Senator UDALL. Thank you.

Senator CARPER. Thank you, sir.

Senator Barrasso, anything else?

Senator BARRASSO. No, thank you.

Senator CARPER. I am going to telegraph a pitch here, Commissioners. One of the ways I like to close down a hearing like this is just to invite the witnesses sometimes to just offer a closing statement, something that has come to your mind, something that because of the interaction of the questions or the answers that you think you would like to add, sort of like a benediction.

So you can be thinking about that; I am going to ask one last question of Chairman Jaczko, then we will do that.

Chairman Jaczko, though we know a lot about what happened in Japan, and if adopted, lessons learned from the accident here in the U.S., we are still learning and will continue to do so for some time, maybe a long time. Based on the continual information coming from Japan, how has the Commission ensured that the NRC will continue to evaluate and analyze that information so that it is incorporated into the current process?

Mr. JACZKO. We have established an organization, it is our Japan Lessons Learned Directorate, that is going to be working on all the identified issues. Part of their task is also, as new information comes in, to evaluate that information and determine if it needs to get added formally to the tasks that we have in front of us. So they will be reporting back to the Commission on a periodic basis, every 6 months, I believe, to update us if they have new information.

So I think we are well prepared to deal with new information as it comes along.

Senator CARPER. OK.

Why don't you all go ahead and give me a closing thought?

Chairman Jaczko, why don't you go first. Just a closing thought you would have for us, use maybe a minute or so if you will.

Mr. JACZKO. I would just say, today I think is Thursday, which is the first day of the March Madness basketball tournament. I think we are, in our lessons learned enhancements, we are in the first round of the tournament. We have a long way to go to get to the Final Four. I think the progress we have made has been substantial. But I think we need to keep the focus, and we need to keep the effort on making progress.

As time goes on, perhaps unlike the Final Four, interest wanes rather than increases. I think it is very important that we not lose

sight of the need to complete these actions and move on, because there will be other challenges that we need to deal with.

Senator CARPER. Good. Thanks for that.

Commissioner Ostendorff.

Mr. OSTENDORFF. Thank you, Senator. I agree with Chairman Jaczko's comment. I strongly agree that we need to keep focused on these issues and that there is a long road ahead. But I will also say that I am very comfortable with where we are as an agency. I think the processes that we have followed to date have stood us in good stead. The integrated prioritized approach of the staff, the steering committee, et cetera have really put us in a good position.

I think along with other colleagues here, we have had a chance just in the last 2 days, with our annual Regulatory Information Conference, to meet with a number of international counterparts. I have met with 12 here in the last couple of days and with situational awareness of what is happening elsewhere in the world, I am very comfortable with where we are.

Senator CARPER. Thank you.

Commissioner Apostolakis.

Mr. APOSTOLAKIS. Thank you, Senator.

I do agree with my colleagues regarding Fukushima. But I would like to say something else. Senator Barrasso earlier quoted from the recent Union of Concerned Scientists report. I said I disagreed with the statement that was contained in that report, and Chairman Boxer implied that we were bashing the author, David Lochbaum.

I would like to correct that impression. I have great respect for David. I always look forward to reports that he authors; usually there is something good there. But I don't agree with him all the time, and in this particular case, I do disagree. I do disagree.

But I have great respect for him. In fact, yesterday I invited him and met with him for 15 minutes to see what he thinks about the current state of affairs. That is the respect I have for him.

Thank you.

Senator CARPER. I am glad you made that clarification. Thank you for saying that.

Commissioner Svinicki.

Ms. SVINICKI. My comment was going to be the same as Commissioner Ostendorff's, which is that I have tremendous confidence in the disciplined process that the NRC and the Commission and the staff have followed to get us to the point where we have, I think, prioritized appropriately. We are moving forward on high priority items.

I think that we have done a very searching review of lessons learned, and I do think that we are focused on the right things. Not everything can be pursued at the same pace. I think we have put the emphasis appropriately on the highest priority items. And I think we have followed a tremendously rigorous process in getting to where we are today.

Thank you.

Senator CARPER. Thank you.

Commissioner Magwood.

Mr. MAGWOOD. Thank you for the opportunity.

One thing, a couple of thoughts. First, I think it is always easy, since we are the center of this, as the regulatory agency of the United States, to think that what we do is very important, and it is. But there are so many other people who have taken a role in thinking about these issues, including the Union of Concerned Scientists with their report American Nuclear Society, American Society for Mechanical Engineers who presented some thoughts yesterday which were quite intriguing.

So there are a lot of people in this country thinking about this, including the nuclear industry. I think it is really important that the American people understand that the nuclear industry really has been very forward leaning in this. They have not resisted what we have been doing. In fact, they have offered very good ideas on their own. I think they should be recognized for the good work they have done.

But I also wanted to close just to let you know that while Commission Ostendorff and I visited the Fukushima site, the most lasting impression for me wasn't really what I saw at the site. It is what I saw on the way to the site. On the van ride through the 12-mile evacuation zone, as you went through neighborhood after neighborhood, going past business after business and realizing there are no people there, it leaves a strong impression on you.

And for me, the image that stays in my mind is that when I looked at the houses going by as we rode past, I noticed that the last thing people seemed to do when they left their homes—maybe for the last time—was draw the drapes to a close. I am not sure what reflex there is in the human psyche that brings that out. But that is what I saw time after time. For me, it is very clear that we have to do everything in our power to make sure nothing like that ever happens in this country. So I have completely devoted myself to making sure that doesn't happen.

Senator CARPER. That was a very poignant comment there. Hopefully, if we are vigilant, we are not going to have to close those drapes as they did over there. But at the same time, maybe we can help them open their drapes again. That is what we are trying to do.

I read in the newspaper the other day that we have been conducting, I think the Federal Reserve has been conducting of late yet another stress test for some of our major banks. You may have seen that. I think they looked at 19 banks and said 15 of them passed with flying colors and 4 others have some work to do in that. That work continues.

I think the NRC has gone through a stress test of its own in recent months. And in terms of how to grapple with Fukushima, how to be supportive and helpful to the folks over there, at the same time to make sure we learn whatever lessons are to be garnered from their tragedy and to ensure that we infuse those lessons and deploy them in an appropriate way here with our nuclear power plants. I am encouraged by what you shared with us today, that we are doing pretty well with respect to that stress test.

We have a couple new nuclear power plants that have been licensed for the first time in some 30 years. And their construction has begun, I think with appropriate Federal support, direct or indirect.

I think it is too bad my colleagues had to leave, but as I am one who supports not tens of billions to support the nuclear industry, but some support as appropriate, particularly through loan guarantees and to making sure that the NRC has the resources that it needs to do your jobs, but at the same time, as I support Federal funds for nuclear, I also think it is appropriate for us to support Federal investments for renewable energies, whether it is offshore wind or biofuels and clean coal, really clean coal.

But the other thing, and I didn't mention it, I don't know if it has been mentioned here today, but the design approval for the new AP1000, I think that is something you can feel good about. I am pleased you have been able to reach that agreement.

So I think with respect to working through agenda, we are at a better place today than we may have been in the past.

My last thought goes back to the visit that Commissioner Magwood and Commissioner Ostendorff paid in Japan. I mentioned I had been on the border of Pakistan, right up against Afghanistan a year or two ago when they had so many Pakistanis evacuated because of the terrible flooding they had there. I had a chance to visit a refugee camp where there were probably about 150,000 refugees still encamped. Through the United Nations, Red Cross, we had provided the resources, most of the people there had no idea that we had done that.

I had the opportunity to address a shura of the elders from the tribes that were there. This was kind of like a surprise, and before we left, the folks running the camp said, would you like to address the shura? I said, well, sure. And I talked to them through a translator about the golden rule. Then I told them, I said, when your children have no food, our children have no food. When your children have no medical care, our children have no medical care. When you have no place to live, then our families have no place to live.

I told them about the golden rule. And I think they got it. Because the golden rule is part of their faith as well.

One of the things, when we were last here, I implored all of you, Commissioner, Chairman and the other Commissioners to keep in mind the golden rule and to treat each other, whether it is just the Commissioners, the other folks who work with you and for you at the NRC to always keep that in mind. I would just say that again today.

And this is actually something I share with my colleagues a whole lot as well, that is a lesson we need to learn and re-learn and re-learn every day. So I would urge you to continue to do that. I am very pleased with today's hearing and pleased with the work that is being done, and thank you all for joining us today.

I would note for the record that some of our colleagues weren't able to join us and still have 2 weeks to submit questions and materials for the record. I would ask that our witnesses respond promptly to those questions so they can become part of the hearing record.

Again, we appreciate each of you, the work that you are doing, your attendance today, and look forward to continuing to work with you to make sure that everything we do, including nuclear power, we do better.

Thanks so much. With that, this hearing is adjourned.
[Whereupon, at 11:50 a.m., the Committee was adjourned.]
[An additional statement submitted for the record follows:]

STATEMENT OF HON. JAMES M. INHOFE,
U.S. SENATOR FROM THE STATE OF OKLAHOMA

Thank you, Chairman Boxer, for holding this hearing and focusing on implementing the lessons learned from Fukushima. The efforts will ensure that the safety of nuclear plants in the U.S.—and around the world—will be enhanced and the use of nuclear energy sustained over the long term.

Ensuring the safe use of nuclear energy is a very serious job. That is why Congress established an independent commission, the NRC, and charged five commissioners with the responsibility to protect public health and safety. The public is best served by a commission that functions collectively and collegially to pool their expertise. That is why I'm anxious to see progress on the renomination of Commissioner Svinicki, which I hope President Obama sends us soon. She is due for renomination in June, and given the scope of issues before the Commission it is important that the agency continues to benefit from her valuable expertise.

As Chairman Jaczko frequently reminds us, we can't be complacent in regard to nuclear safety. At the same time we can't allow ourselves to be paralyzed by fear. Harnessing any energy source carries some measure of risk that must be safely managed.

For the first time in 34 years the NRC has issued a license to build two new reactors creating 3500 construction jobs and 800 permanent jobs. This is a true milestone in the Agency's history and reflects well on the Commissioners present and past that worked so hard to prepare for new applications. Congratulations to those of you who have worked on this license. The Chairman split with his fellow Commissioners and opposed the license saying: "I can't support issuing this license as if Fukushima had never happened. But without this license condition, in my view, that is what we are doing." In fact, 1 month later, the Commission voted for the new Vogtle units to receive the same Orders issued to existing plants. There was no need for Chairman Jaczko to take his "my way or the highway" approach here, lashing out at his colleagues and implying that they were ignoring the lessons of Fukushima. These Orders, reflecting the lessons of Fukushima, are as applicable at Vogtle as they are at any U.S. facility.

License renewal is an issue I have worked on for over a decade. When I chaired the Clean Air and Nuclear Safety Subcommittee beginning in 1996, we made sure the NRC was prepared to review license renewal applications efficiently in 24 months (or 30 months if it was contentious). In Massachusetts the Pilgrim plant filed its application over 6 years ago. For almost 5 years, 3 of those years under Chairman Jaczko's leadership, Pilgrim has been subjected to an unprecedented cycle of contentions and petitions from interveners. Chairman Jaczko again dissented from his colleagues in a recent Commission decision on yet another petition. He wanted to lower a long established threshold for contentions to allow even more delay to the renewal process.

Chairman Jaczko gave a speech last month and stated that one scenario for nuclear energy's future includes new plant construction and license extensions. He said the other scenario, which is "just as plausible" is that the industry is "unsustainable" and "dominated by a process of continuing decommissioning." He said, "I think today there are a number of decisions about nuclear safety and actions related to nuclear safety that may move you on one of those paths versus the other path."

It's clear which path Chairman Jaczko prefers, and it's no secret that I strongly disagree with him on that. As NRC Chairman he takes every opportunity to portray himself as the sole Commissioner most dedicated to public safety while condemning his colleagues and doing his utmost to hinder and delay licensing actions.

To the other four Commissioners, let me say that your debates and disagreements are healthy and respectful. Your actions may prevent the imposition of an unpredictable regulatory burden that makes nuclear energy economically unfeasible, much the way EPA regulations are driving the premature shutdown of coal-fired power plants. It's up to you four to uphold the NRC's reputation for reasoned and balanced regulation.

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